GE VERNOVA

PROFICY® SOFTWARE & SERVICES

CONFIGURATION HUB

User Guide

GE VERNOVA

Proprietary Notice
The information contained in this publication is believed to be accurate and reliable. However, GE Vernova assumes no responsibilities for any errors, omissions or inaccuracies. Information contained in the publication is subject to change without notice.

Trademark Notices

We want to hear from you. If you have any comments, questions, or suggestions about our documentation, send them to the following email address:
doc@ge.com

Configuration Hub Documentation

Contents

Chapter 1. Important Product Information....17

What's New in Configuration Hub 2024.... 17

Known Issues and Limitations 20

Fixed Defects 23

System Requirements 24

Chapter 2. Getting Started.... 26

Introduction to the Configuration Hub Framework....26

Sample Deployment Architectures....27

Install and Uninstall Options.... 31

Available Product Plugins....38

Common Panels.... 40

Common Panels....40

Application Bar 40

Navigation Panel....42

Details Panel....44

Concurrency Management....47

Node Management....48

Node Manager - Administration.... 48

Certificate Management....66

Overview....66

Product Registration....86

Overview....86

Install Time Registration.... 87

Central Registration.... 91

Upgrade/Migration Considerations.... 100

Central License Management....101

Central License Management....101

High Availability for Configuration Hub 110
Overview 110
Configure High Availability 112
Install Failover Clustering Feature 114
Create Failover Cluster 115
Create Role 119
Create Client Access Point (Virtual IP) 122
Add Dependencies to Role 124
Create Network Attached Storage 125
Install Configuration Hub on Cluster Nodes 128
Handling Silent Installation 132
Chapter 3. Proficy Authentication 135
About Proficy Authentication 135
Set up Proficy Authentication 135
Get Started With Proficy Authentication 141
Manage Identity Providers 146
LDAP 146
SAML 155
Enable Multi-Factor Authentication 179
Delete Identity Provider 182
Manage Groups 183
Overview of Managing Groups in Proficy Authentication 183
Create Groups 189
Modify Groups 191
Map Groups 192
Add/Remove Users in a Group 195
Add/Remove Sub-Groups in a Group 196
Delete Group 197
Manage Users 198

Create Users....198
Add/Remove Groups for a User....200
Reset User Password....202
Delete User....203
Windows Integrated Authentication / Auto-login....204
Configure Security Policy....207
Create Service Principal Name....209
Generate Keytab File....212
Proficy Authentication Service Configuration....215
Configure Browser....216
Example Configuration for Multi-domain and Auto-login Functionality....217
High Availability....220
Configure High Availability for Proficy Authentication....220
Configure iSCSI Target....222
Configure iSCSI Initiator....222
Create a Virtual Disk....225
Initialize a Virtual Disk....226
Create a Cluster....228
Configure Role....233
Configure Proficy Authentication Installation....238
Prerequisites for Installing Operations Hub with External Proficy Authentication....243
Customize Login Screen....248
Backup and Restore....250
Back Up the Proficy Authentication Database....250
Restore the Proficy Authentication Database....252
Troubleshooting Proficy Authentication....252
Error 431: Request Header Fields Too Large....252
Windows Auto-login Error Logs....253
Issue: Duplicate LDAP User Creation in Proficy Authentication Database....260

Chapter 4. iFIX 262

Overview 262

iFIX Overview 262

Overview of iFIX in Configuration Hub 262

Integrated Development Environment 264

Prerequisites to Use Configuration Hub with iFIX 264

Configuration Information 265

Access iFIX Web Configuration 276

Connections 278

Connections Overview 278

OPC UA Connections 278

IGS Connections 290

Drivers 298

Network Connections 300

Special Considerations for SCADA Enhanced Failover 305

SQL Connections 307

Model 310

Model Overview 310

Model Panel 311

Type Creation 313

Type Variables 315

Template Overview 318

Template Management 318

Substitutions 321

Expression Builder 323

Object Creation 323

Model Import and Export 324

Model Tags in iFIX 325

Database 328

Database Overview....328
Database Management....334
Tag Management....386
Validations....388
Custom Editors....389
Tag Properties....390
Project Security....930
Overview of Project Security....930
Add or Modify Users....931
Add or Modify Groups for Proficy Authentication....934
Add or Modify Security Areas....935
Auto Login Configuration....937
Alarms....939
Defining Alarm Areas....939
Alarm Services....941
Alarm Printers....946
Alarm Events....948
Alarm Queue Configuration....950
Common Message Format Configuration....952
Common Alarm Areas Configuration....953
Alarm Clients....954
Project Settings....955
Overview of Project Settings....955
Starting and Stopping iFIX Projects....958
Add a New Project....960
Add an Existing Project....962
General Settings....963
Startup Options....965
Startup Schedules....968

Startup Pictures..... 969
Historian.....970
SCADA Failover..... 971
Task Configuration.....975
Deployment..... 979
Project Deployment..... 979
Save and Publish.....981
Chapter 5. CIMPLICITY..... 984
Overview..... 984
Overview of CIMPLICITY in Configuration Hub..... 984
Access Configuration Hub from CIMPLICITY.....985
Registration..... 987
About Registering the CIMPLICITY Plug-in.....987
CIMPLICITY Plug-in Registration Use Cases..... 988
Register the CIMPLICITY Node with Proficy Authentication..... 991
Add the CIMPLICITY Node and Register the Plug-in with Configuration Hub..... 993
Managing CIMPLICITY Plug-in in Configuration Hub..... 998
Start and Stop a CIMPLICITY Project..... 998
Select and Browse Devices..... 1001
Select and Browse Tags from an MQTT Device..... 1005
Create SCADA Points..... 1008
Update or Modify CIMPLICITY Node or Plug-in 1011
Unregister CIMPLICITY Plug-in 1014
Delete CIMPLICITY Node..... 1017
Chapter 6. Historian..... 1021
Overview.....1021
Historian Overview.....1021
Overview of Historian in Configuration Hub.....1021
Workflow.....1023

Setting up Configuration Hub....1023
About Setting up Configuration Hub....1023
Install the Historian Server....1024
Install Web-based Clients....1033
Install Collectors....1050
Perform Post-Installation Tasks....1054
Upgrade....1055
Access Configuration Hub....1055
Historian Plugin Management in Configuration Hub....1060
Common Tasks....1072
Setting up a Stand-Alone System....1075
About Setting up....1075
Add a Collector....1076
Add Tags....1077
Setting up a Horizontally Scalable System....1079
About Setting up a Horizontally Scalable System....1079
Add a Server....1080
Add a Collector....1081
Add Tags....1082
Browse Tags using Distributed or Mirror Node Servers when Primary Server is Inactive....1084
Setting up High Availability....1086
About Data Mirroring....1086
Create....1087
Create a Data Store....1089
Creating a Model....1090
About a Historian Model....1090
About Object Templates....1095
Workflow for Creating a Historian Model....1098
Create an Object Type....1099

Include a Contained Type.... 1104
Create an Object Instance.... 1107
Provide Data for a Static Variable.... 1109
Collect Data for a Direct Variable.... 1111
Collect Data for an Indirect Variable.... 1114
Export an Object Type/Instance.... 1119
Import an Object Type/Instance.... 1121
Copy an Object Type.... 1122
Delete a Template.... 1126
Delete an Object Instance.... 1128
Delete an Object Type.... 1129
Managing Historian Systems.... 1130
Access a System.... 1130
Access the Collectors in a System.... 1139
Access Offline Configuration Collectors.... 1141
Access the Tags in a System.... 1144
Add a System.... 1146
Add a Server.... 1147
Set Up a Mirror of Mirror.... 1148
Remove a Server.... 1158
Set a Default Location.... 1158
Modify a System.... 1159
Configure Advanced Settings.... 1160
Configure Labels of Spare Fields.... 1163
Set a Default System.... 1164
Delete a System.... 1164
Managing Mirror Locations.... 1165
Create.... 1165
Rename.... 1166

Add a Machine....1167
Remove a Machine....1168
Delete....1169
Managing Data Stores....1170
About Data Stores....1170
Create a Data Store....1171
Access a Data Store....1172
Rename a Data Store....1177
Set as Default....1181
Access Archives....1182
Apply Configuration Template....1182
Multiple Archive Paths....1183
Access Activity Logs....1189
Access Tags....1189
Specify Tags for Data Collection....1190
Add a Tag Manually....1192
View Performance....1195
Delete....1197
Adding a Collector Instance....1198
The Calculation Collector....1198
CygNet Collector....1201
The File Collector....1205
The HAB Collector....1208
About Adding an iFIX Collector Instance....1220
The iFIX Collector....1224
The MQTT Collector....1229
The MQTT Sparkplug B Collector....1238
The ODBC Collector....1246
The OPC Classic Alarms and Events Collector....1251

The OPC Classic DA Collector....1253
The OPC Classic HDA Collector....1259
The OPC UA DA Collector....1263
The OSI PI Collector....1268
The OSI PI Distributor....1272
The Python Collector....1275
The Server-to-Server Collector....1278
The Server-to-Server Distributor....1282
The Simulation Collector....1286
The Windows Performance Collector....1290
The Wonderware Collector....1294
Collector Configuration - Common Fields....1298
Sending Data to Cloud....1306
Alibaba Cloud....1306
AWS Cloud....1313
Azure Cloud (Key-Value Format)....1320
Azure Cloud (KairosDB Format)....1327
Google Cloud....1333
Predix Cloud....1340
Protocols and Port Numbers....1345
Managing Collector Instances....1346
Managing Collectors Using Configuration Hub....1346
Access a Collector....1347
Access Tags....1350
Add a Collector....1351
Enable MTLS Security for Collectors....1351
Modify a Collector....1353
Add a Comment....1354
Access Comments....1355

Start a Collector....1356
Stop a Collector....1357
Restart a Collector....1358
Pause Data Collection....1360
Resume Data Collection....1361
Clear Buffer....1362
Move Buffer....1363
Change Destination....1364
Reset Performance Counters....1365
Reset Overruns....1366
Update Collector Credentials....1367
Apply Configuration Template to a Collector....1369
Configure Collector Redundancy....1370
Delete a Collector....1373
Managing Offline Configuration Collector Instances....1374
Access Offline Configuration Collectors....1374
Manage Offline Configuration Collectors....1376
Access Tags....1377
Managing Tags....1378
About Tags....1378
About Array Tags....1379
About Collector and Archive Compression....1379
About Scaling....1385
About Condition-Based Collection....1385
Specify Tags for Data Collection....1386
Add a Tag Manually....1388
Access a Tag....1391
Configure Multiple Tags....1406
Access Trend Chart....1408

Access Last 10 Values....1409
Access a Tag Alias....1413
Export Tags as a CSV File....1414
Import Tags from a CSV File....1416
Rename a Tag....1417
Copy a Tag....1419
Stop Data Collection....1421
Resume Data Collection....1422
Remove a Tag....1423
Delete a Tag....1424
Managing Enumerated Sets....1426
About Enumerated Sets....1426
Create an Enumerated Set....1427
Assign an Enumerated Set to a Tag....1429
Export an Enumerated Set....1429
Import an Enumerated Set....1430
Rename Enumerated Set....1430
Delete Enumerated Set....1431
Managing Data Attribute Enumerated Set....1431
About Data Attribute Enumerated Set....1431
Create a Data Attribute Enumerated Set....1432
Assign a Data Attribute Enumerated Set to a Tag....1435
Export Data Attribute Enumerated Sets....1436
Import Data Attribute Enumerated Sets....1436
Rename a Data Attribute Enumerated Set....1437
Delete a Data Attribute Enumerated Set....1437
Managing User-Defined Data Types....1438
About UDTs....1438
Create UDT....1438

Assign to Tag....1439
Export User-defined Types....1440
Import User-defined Types....1440
Rename User-defined Types....1441
Delete User-defined Types....1441
Managing Archives....1442
About Archives....1442
Guidelines for Archive Sizing....1443
Access an Archive....1444
Create Archives Automatically....1446
Create Archives Manually....1447
Back up an Archive....1449
Back up Archives with Volume Shadow Copy Service....1450
Restore an Archive....1452
Close an Archive....1453
Remove an Archive....1453
Reading/Writing Data....1453
Query Data....1453
Write Data....1457
About Saved Query....1460
Managing Alarms and Events....1469
About Alarms and Events....1469
Requirements....1469
Create an Alarm....1470
Access/Filter Alarms....1471
Back up Alarms....1472
Restore Alarms....1473
About Purging Alarms....1473
Managing Configuration Templates....1476

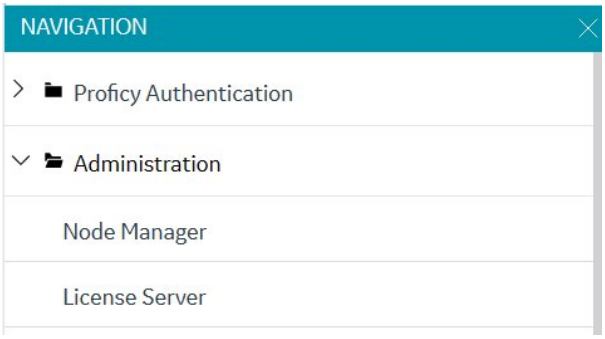
About Configuration Templates....1476
Create a Configuration Template for Collectors....1476
Apply Configuration Template to a Collector....1484
Create a Configuration Template for Data Stores....1486
Apply the Configuration Template to a Data Store....1491
Managing Reports....1492
About Reports....1492
Generate Reports....1493
Export the Generated Report as a CSV File....1500
Save the Generated Report as a PDF File....1500
Accessing Activity Logs....1501
Troubleshooting Historian and Configuration Hub....1503
Chapter 7. Operations Hub....1508
Operations Hub Overview....1508
Overview of Operations Hub with Configuration Hub....1508
Installation Process Overview....1509
Operations Hub (New Layout)....1510
Panels Layout....1510
Navigation Panel....1512
Components Panel....1515
Display Panel....1527
Details Panel....1532
HMI Graphics....1546
Chapter 8. Webspace....1573
Introduction to Webspace....1573
Overview of Webspace with Configuration Hub....1573
Sample Webspace Deployment Architecture....1574
How to Install a Webspace Server....1575
Exporting the Root Certificate for Webspace Setup....1577

Importing the Certificate for Webspace Setup....1579
Registration with Configuration Hub for Webspace....1580
Webspace Settings in Configuration Hub....1582
Webspace Plugin in Operations Hub....1582
Troubleshooting Webspace with Configuration Hub....1587
Chapter 10. MQTT Client....1603
Overview....1603
Introduction....1603
Prerequisites and Hardware Requirements....1604
Sample Deployment Architectures for MQTT Client....1604
Registration....1606
Overview of MQTT Client Registration....1606
Central Registration for MQTT Client....1607
Install Time Registration for MQTT Client....1618
Configuration....1628
MQTT Client Configuration....1628
Save and Publish....1657
OPC UA for MQTT Clients....1663
Chapter 11. Settings....1672
Switch Users....1672
Modify Layout....1672
Host Name Changes for Configuration Hub....1672
Port Changes for Configuration Hub....1674
Chapter 12. Troubleshooting....1676
Log Files....1676
Frequently Asked Questions....1679

Chapter 1. Important Product Information

What's New in Configuration Hub 2024

New Administration Plugin



What is it?

The Navigation panel in Configuration Hub, now includes a new plugin named Administration.

Why use it?

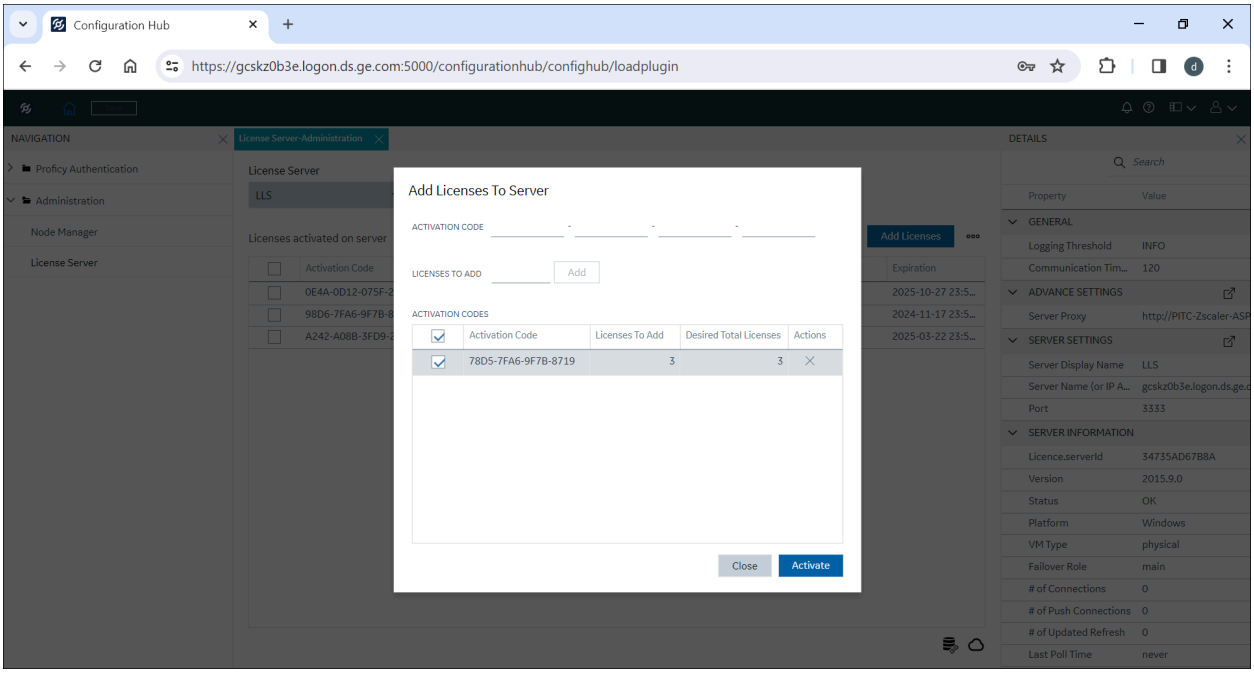
Use it view and manage Proficy licenses, nodes, and Configuration Hub certificates.

Resources

License Server-Administration *(on page 101)*

Node Manager - Administration *(on page 48)*

Central Proficy License Management



What is it?

You can now centrally manage Proficy product licenses from Configuration Hub. From the License Server-Administration panel, you can perform actions such as adding a new Local License Server, adding activation codes of the Proficy product(s) to the Local License Server, removing activation codes, reserving licenses, cleaning licenses, generate offline activation requests, generate response file, update licenses from response file, and other actions.

Why use it?

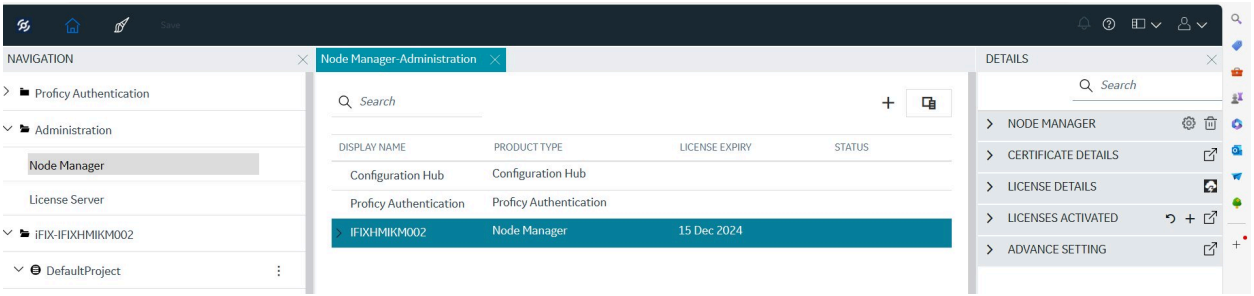
Use this feature for a seamless and harmonized user experience, without having to leave Configuration Hub and all from a web browser.

Resources

Central License Management *(on page 101)*

Node Manager - Administration *(on page 48)*

Node Management in Configuration Hub



What is it?

The Node Manager centralizes control over product details, license activations, and certificate management.

Why use it?

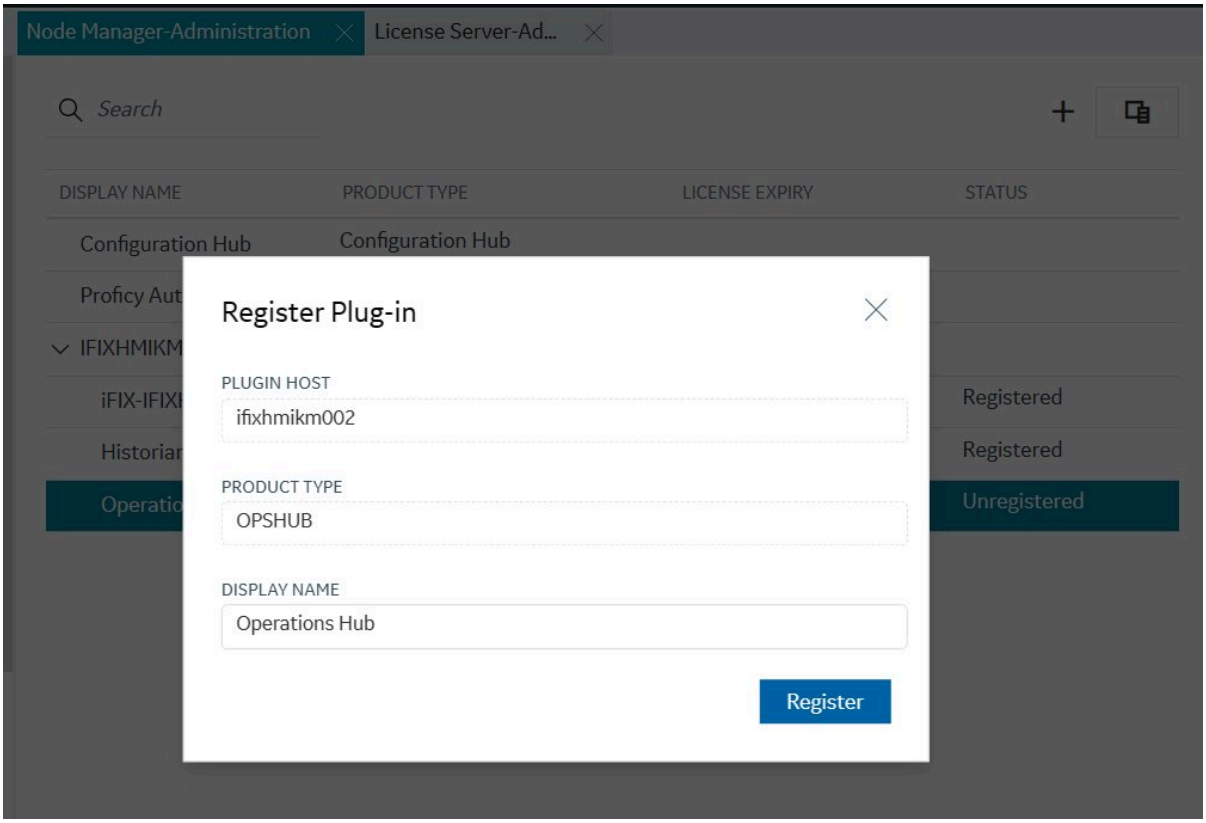
Use this feature for a seamless and harmonized user experience, without having to leave Configuration Hub and all from a web browser.

Resources

Node Manager - Administration *(on page 48)*

Product Details and Actions under Node Manager *(on page 60)*

Product Registration in Configuration Hub



What is it?

Configuration Hub facilitates the registration of product plug-ins and centralizes the management of these plug-ins.

Why use it?

Use these registration options ensure a seamless and harmonized user experience across the installation and registration processes for various products.

Resources

Install Time Registration *(on page 87)*

Central Registration *(on page 91)*

Upgrade/Migration Considerations *(on page 100)*

Known Issues and Limitations

The following limitations apply to using Configuration Hub 2024:

Area	Description
Multiple Users and Browser Sessions	Multiple users can log into the same server and make changes, but they must be different browser sessions.
Multiple Plugins	When multiple plugins, for example: iFIX and Historian, they must be registered to Configuration Hub. All plugins should use same Proficy Authentication Server Name. If the Configuration Hub or Proficy Authentication Server are part of a domain system, then Fully Qualified Domain Name (FQDN) name should be used for Server Name.
Historian Server	For Historian, if only one machine remains in a mirror group, you cannot remove it.
Historian Web Admin	If you install Configuration Hub and the Historian Web Admin console on the same machine, and use self-signed certificates for both of them, the login page for Configuration Hub does not appear. To prevent this issue, disable the domain security policies: 1. Access the following URL: chrome://net-internals/#hsts 2. In the **Domain Security Policy** section, in the **Delete domain security policies** field, enter the domain name for Configuration Hub, and then select **Delete**.
iFIX SCADA	When iFIX and Configuration Hub are on different computers and an error displays that the iFIX SCADA is not active or unable to retrieve locale information, ensure that iFIX is started and that SCADA is enabled. (If iFIX has Failover enabled, then only the Primary Node in Maintenance Mode can connect to Configuration Hub.) Also, make sure that both systems have same date and time.
iFIX Upgrade	When iFIX is upgraded from a previous version of iFIX, sometimes the iFIX Register to Configuration link shows as non-trusted. You will need to delete the certificates and binding, and then recreate them using the iFixConfigServiceCertTool.exe tool (as an Administrator). As a final step to establish the trust, you would need to copy the certificate files (iFIX_OpcuaConfigServer.crt and iFIX_OpcuaConfigServer.key files) from the C:\Program Files (x86)\Proficy\iFIX\CFG\iFIX_Opcua-

Area	Description
	ConfigService\pki folder into the C:\Program Files (x86)\Proficy\iFIX \web\conf directory, and restart iFIX.
Model Publish from iFIX	Be aware that if you want to publish a model from iFIX 2024 to Operations Hub, you must use Operations Hub 2024.
Naming Conventions	Alarm name, tag name, model object instance names should not be same. iFIX entities like the database name, tag names, alarm areas, model types, and model instances must be unique. Ensure you use unique names when creating these items. Spaces are not supported in the model or iFIX tag names in Configuration Hub.
Shared Security Paths in iFIX	Computers connected in a Work Group environment is not supported in iFIX 2024 with shared drive Security Paths (using Configuration Hub).
iFIX Registration	The iFIX Registration page does not function when the Client ID or Client Secret for Configuration Hub or Proficy Authentication include any characters other than the alphanumeric character set from the English keyboard. This is currently a known limitation. There is no workaround.
Proficy Authentication	If more than one LDAPS Identity Providers are created, the test connection fails for second LDAPS connection. Workaround: Restart the "GE Proficy Authentication Tomcat Web Server" service, then retest the connection.
English Proficy Installer	For the English Proficy installer, when entering the Client ID or Client Secret fields for Configuration Hub and Proficy Authentication during the install, you can only use English alphanumeric characters and the following symbols: ~`!@#$*()-_={}[]\'",.?/
Translated Proficy Installer	For a translated Proficy installer, when installing on a non-English operating system, you can enter characters from that specific language in the Client ID and Client Secret fields displayed in the installer.

Area	Description
Non-English Characters and Installer	Configuration Hub cannot be installed on computers with machine names containing non-English characters.
Data Connections and Regional Number Formats	In Configuration Hub, in the iFIX > Connections panel, group parameters do not support regional number formatting.
German Language Limitation	The German Letter ß is not supported for Input Fields in Configuration Hub, such as in the Database Tag Name/Security/Project Settings/Connections-Network fields.
Chinese Language Limitation	On Chinese systems, there is a an issue when you right-click a node in the Node Manager and select Manage. The Node Manager panel does not expand the node and stays with spinner. The workaround to manage the node from the Details panel: • From the Details panel > Node Manager, click the manage settings  . • In the popup dialog box that appears, you can now view or update the product name and status.
French and Polish Language Limitation	In Configuration Hub, the Tag field values in the iFIX Model Panel do not support the space as a thousand separator for French and Polish. For example, do not use a value such as '1 100' in your tag field.

Fixed Defects

The following defects were fixed in Configuration Hub 2024:

Case #	Area	Description
01080612	Proficy Authentication	While attempting to set up the LDAP identity provider, an error occurred with the use of a comma in the binding user's distinguished name (DN). The comma character is not supported due to its usage as a separator in the field. This issue is resolved in Configuration Hub 2024.

Case #	Area	Description
01080043	Proficy Authentication	The LDAP group mapping feature in Proficy Authentication was found to be non-functional when the Chrome browser was set to the Slovenian language. It is possible that the issue may also occur when the browser is set to other languages. The issue has been identified as a translation problem within the Proficy Authentication connection component. This issue has been resolved by implementing a fix to ensure proper translation handling. This issue is resolved in Configuration Hub 2024.
01079388	Proficy Authentication	Previously, LDAP identity provider user account was getting locked out. This issue is resolved in Configuration Hub 2024.
01073637	Proficy Authentication	Previously, the ability to establish communication with the LDAP server and fetch LDAP groups failed within Configuration Hub. This issue is resolved in Configuration Hub 2024.

System Requirements

The following minimum requirements are needed for using Configuration Hub 2024.

Software Requirements: Supported Browsers

Only the following browsers were tested for use with Configuration Hub and iFIX: Google® Chrome, Microsoft® Edge based on Chromium, Mozilla® Firefox, or Apple® Safari (MAC OS only).

Note:
Sometimes the MAC OS cannot resolve the system name. In this case, update the hosts file. Also, on the MAC OS, you will be required to manually install the Configuration Hub root certificate.

Hardware Recommendations

Be aware of the following hardware recommendations:

- For Configuration Hub, it is recommended to use a display setting at 1920x1080 or better, with scaling set to 100%.

Language Support

Be aware of the following language related requirements:

- Configuration Hub cannot be installed on computers with machine names containing non-English characters.
- Configuration Hub will display the number formats and strings as they appear on SCADA or Historian Server node. Changing the browser language will not have impact on the appearance of this data.
- For the Proficy installer, when installing iFIX English with non-English Regional Settings, non-English characters are not supported for the Client ID or Client Secret fields in the installer.

Compatibility with Other Proficy Products

Several Proficy products work with Configuration Hub. The following is a general set of versions tested to work with the Configuration Hub 2024 product:

Product	Required Version
Proficy Authentication	2024
Proficy iFIX	2024
Proficy Historian	2024
Operations Hub	2024
MQTT Client	2024
Proficy CIMPLICITY	2024
Webspace	6.2 / 2024

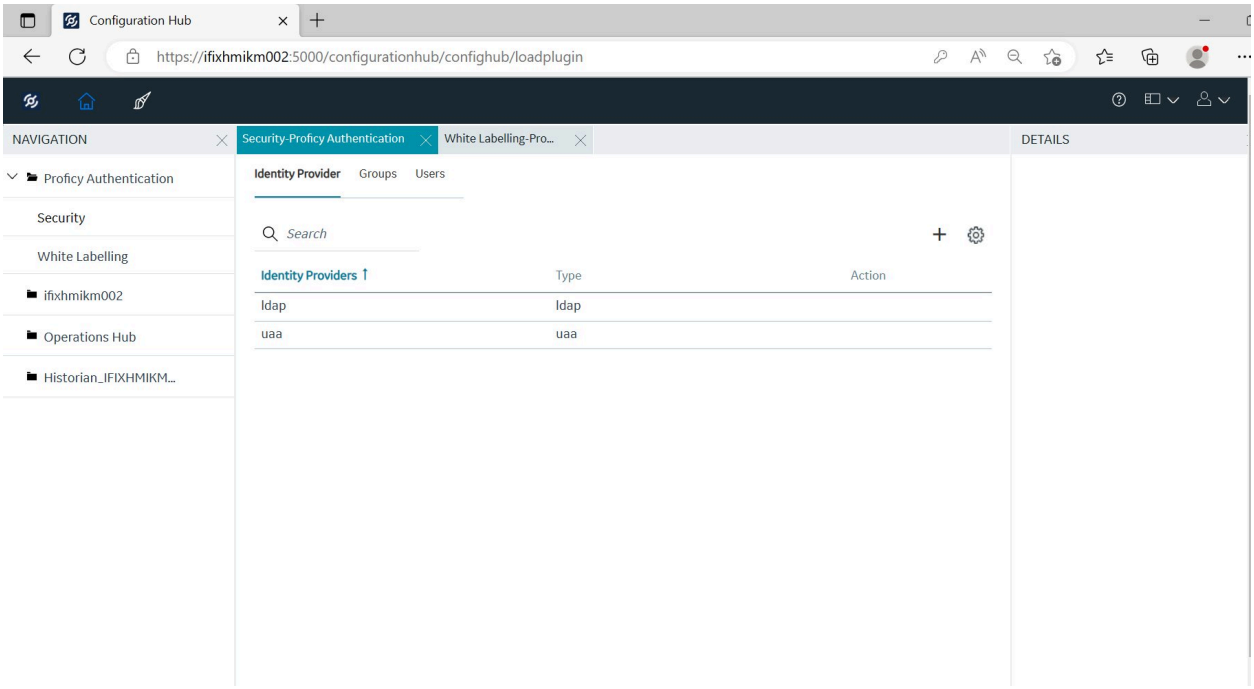
Please see the individual product IPI for more information on software and hardware requirements per product.

Chapter 2. Getting Started

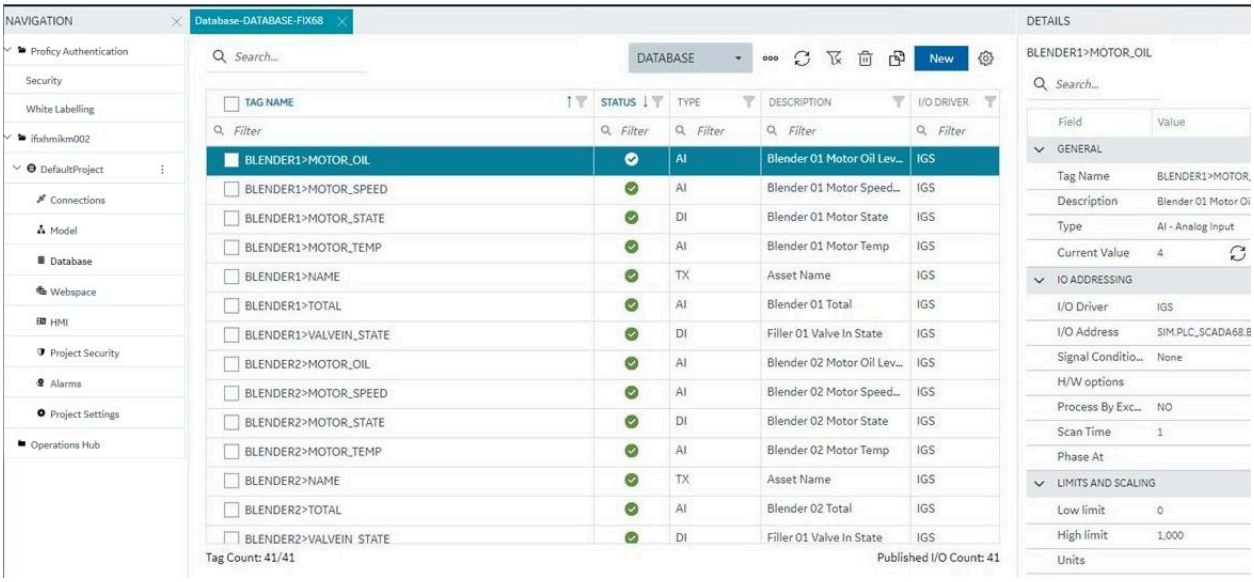
Introduction to the Configuration Hub Framework

Configuration Hub allows you to configure your Proficy products all together in one place, and access and configure them from anywhere. You can view multiple Proficy applications from within Configuration Hub. For example: Proficy Authentication, iFIX, Historian, and Operations Hub.

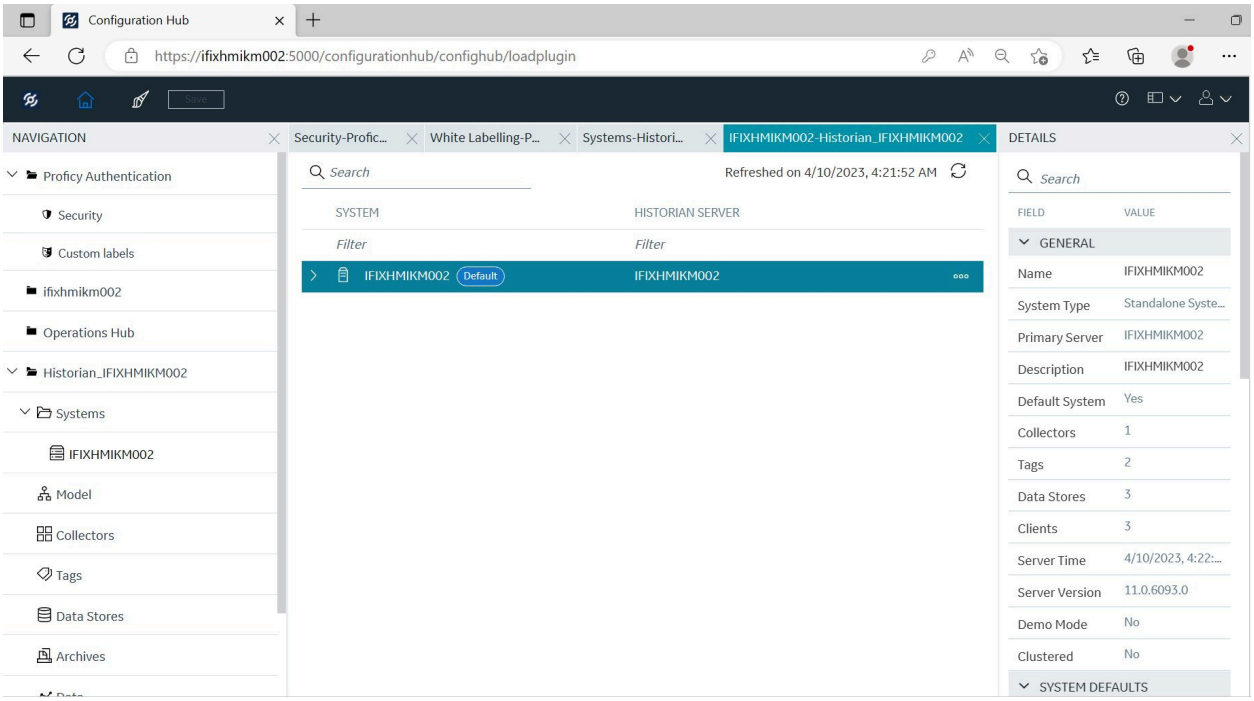
The following graphic shows an example of Configuration Hub with Proficy Authentication selected:



The following graphic shows an example of Configuration Hub with the iFIX Database panel selected:



The following graphic shows an example of Configuration Hub with Historian and a Server selected from the Historian Systems panel:

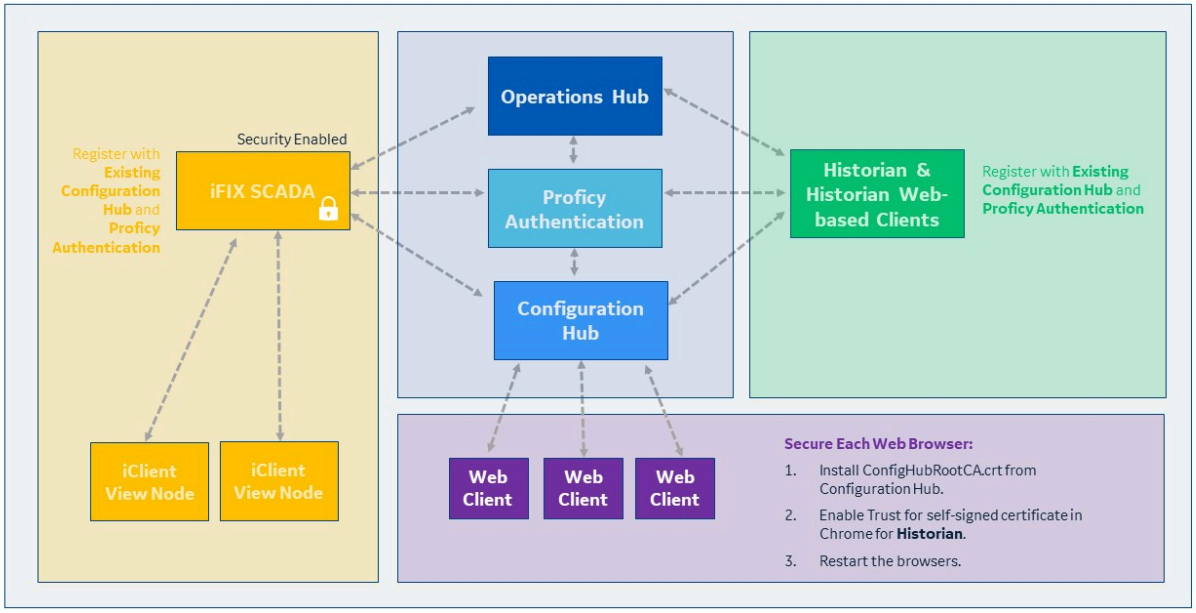


Sample Deployment Architectures

The following examples show different types of deployment architectures you may choose to use with Configuration Hub.

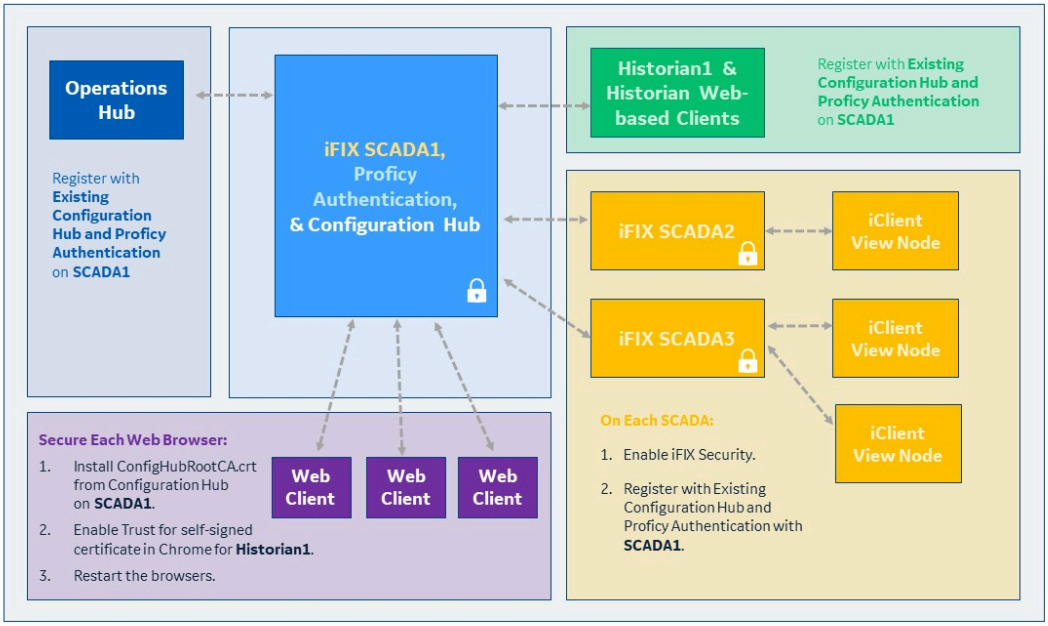
Example 1

The following example shows Configuration Hub, Proficy Authentication, and Operations Hub installed on one central computer, with iFIX (SCADA), View nodes, and Historian all on different computers. This diagram represents a highly recommended deployment architecture.



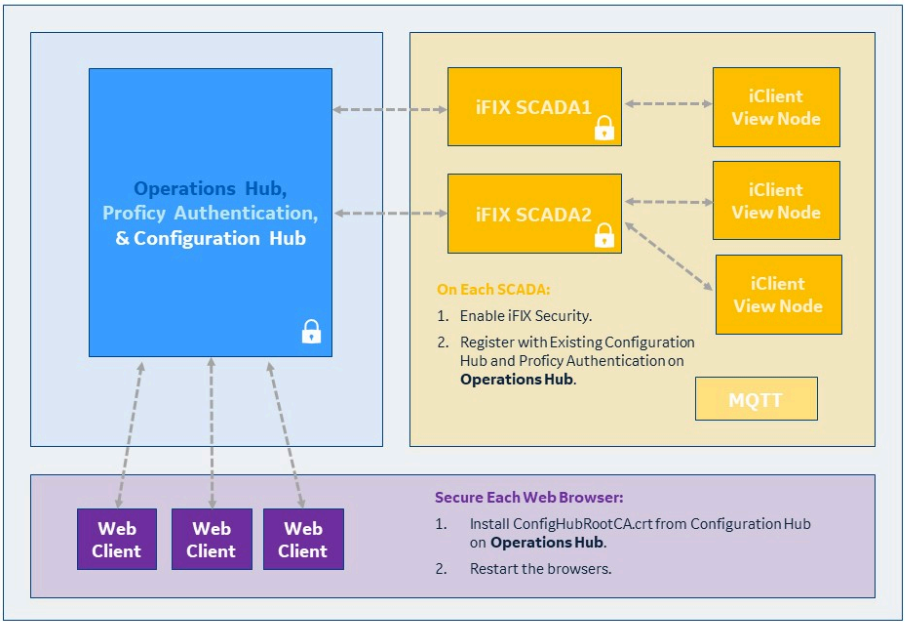
Example 2:

The following example shows an iFIX SCADA (SCADA1) with Configuration Hub and Proficy Authentication installed. Operations Hub, the Historian Server (Historian1), and additional SCADAs (SCADA1 and SCADA2) are on different computers connecting to that existing SCADA1 node.



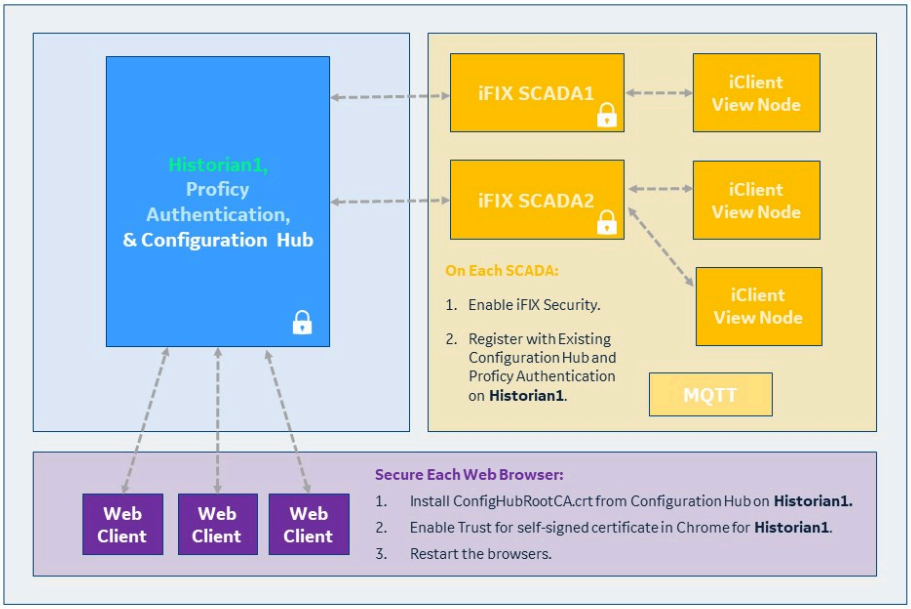
Example 3

The following example shows a computer with Operations Hub, Proficy Authentication, and Configuration Hub all on the same box, with other computers with iFIX (SCADA1 and SCADA2) connecting to that existing node, along with web-based clients.



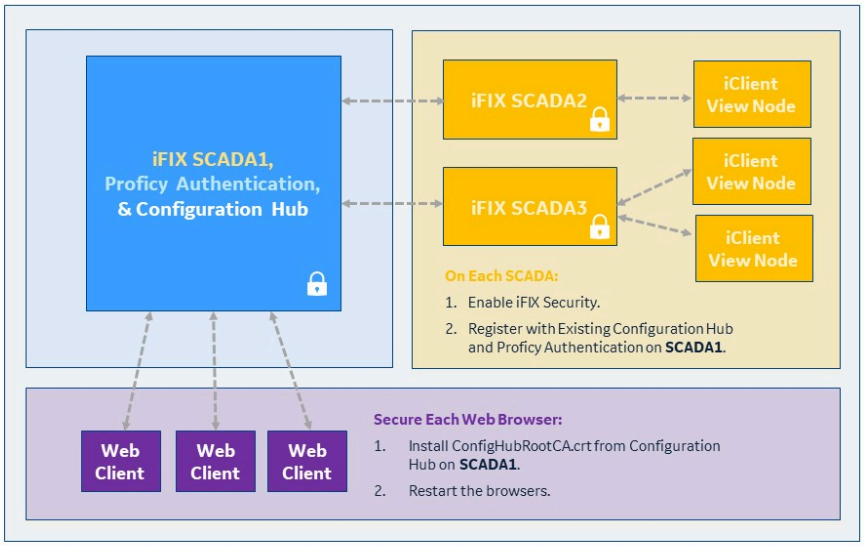
Example 4

The following deployment architecture illustrates Historian (Historian1), Proficy Authentication, and Configuration Hub all on the same box, with the iFIX SCADAs (SCADA1 and SCADA2) connecting to the existing Historian1 server, along with web-based clients.



Example 5

The following example shows iFIX SCADA (SCADA1) with Proficy Authentication and Configuration Hub installed with other SCADAs (SCADA2 and SCADA3) on different computers connecting to the existing node with SCADA1, along with web-based clients.



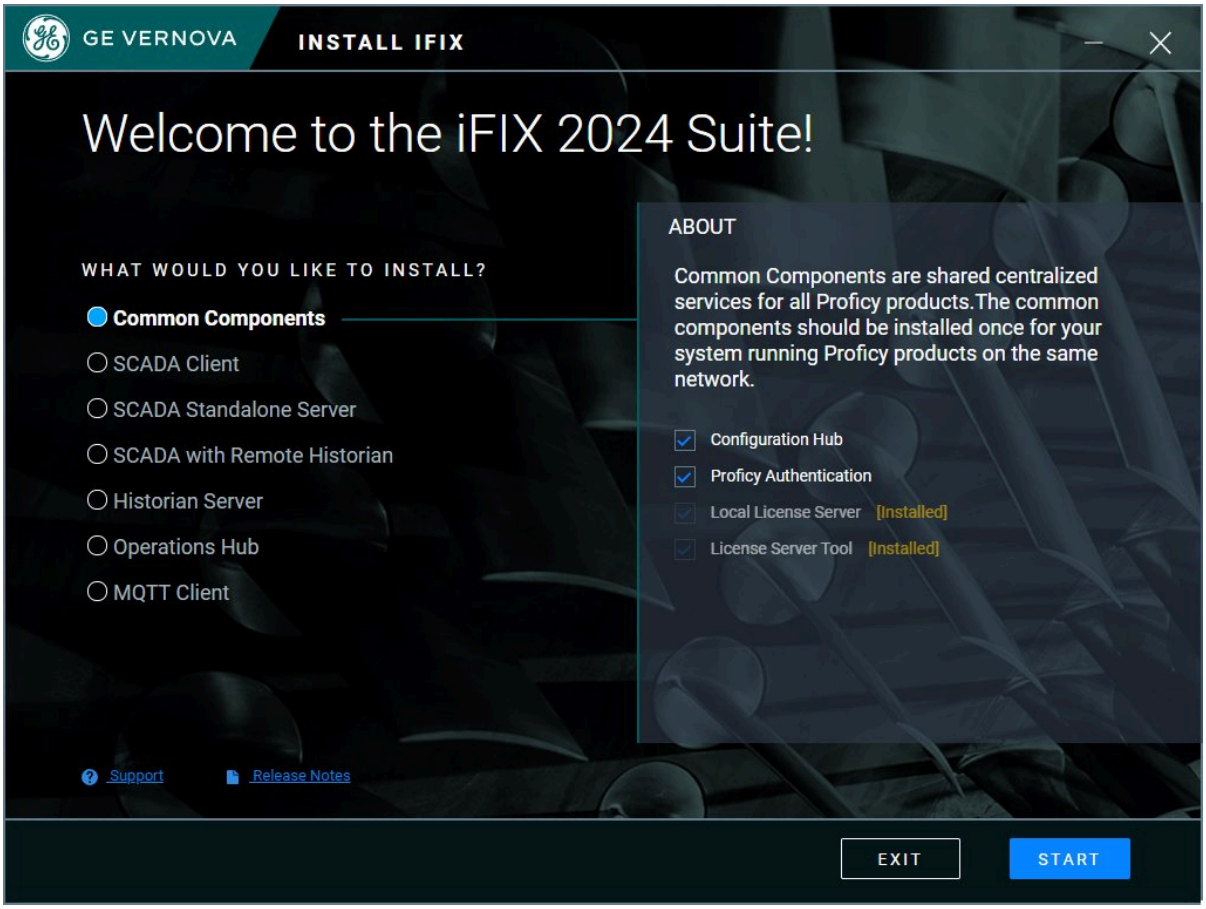
Install and Uninstall Options

Configuration Hub, along with the iFIX SCADA, Historian, and Operations Hub products are all installed using Proficy installer experience.

Proficy installer

To install Configuration Hub, use the Proficy installer Common Components option, as shown in the following figure. This figure shows the SCADA version of the Proficy installer. Configuration Hub only needs to be installed once. It should not be installed on a computer with the Webspace Server or a Enhanced Failover pair.

Important:
In order to access Historian from Configuration Hub when using iFIX, you need to manually install the Web Components by browsing the folders on the Proficy installer to this location: Historian \WebComponents, and then right-clicking the install.exe > Run as Administrator, and install Historian Web-based Clients. Currently, there is not an option to install Web Components from the iFIX Proficy install experience. You will need to make sure that the Historian security groups *(on page 186)* are added to your admin user in order to view Historian from Configuration Hub. Restart the browser, after modifying your user *(on page 200)*, and then you can access Proficy Historian from within Configuration Hub, along with iFIX.



Uninstall

To uninstall Configuration Hub, or any of it's associated plug-ins (Historian, Webspace, Operations Hub, for instance), use the **Add Remove Programs** feature in Microsoft Windows. Locate the app you want to uninstall, and select **Uninstall** to remove it. After uinstalling, you can then choose to reinstall with the Proficy installer again, or through one of the individual installers found in the subfolders on the Proficy installer.

Installing from a Command

A response file named SilentInstallResponseFile.json is saved to the install folder with the settings you selected for the install – each time you run the Proficy install. This response file can be used to run the Proficy installer from a command line or programmatically. This can be helpful, for instance, if you have several computers on your network that you need to run the installer on.

Note:
: As of iFIX 2024, you must use a file created by the latest installed version. For example, if you have installed iFIX 2024, you cannot use a SilentInstallResponseFile.json file created by any earlier iFIX version.

You can make your own SilentInstallResponseFile.json using any of the full list of options in detailed in the sections that follow, or modify the one created for you when you installed your products with the Proficy install. You can find this autogenerated file in the install folder, which is by default: C:\Program Files (x86)\Proficy.

To run the Proficy installer from a command line, use the following command line:

```
D:\Setup\setup.exe --response SilentInstallResponseFile.json
```

where *D:* is the drive where the Proficy installer is located.

Note:
In addition to the options provided in the following sections, you can further customize the options selected for the iFIX install by using the scadaconfig.ini for SCADA installs or the installconfig.ini for iClient (View node) installs. Refer to the iFIX Documentation for more information.

Common Components

```
{
"packageSelected": "CommonComponents",
"installLocation": "C:\\Program Files (x86)\\Proficy",
"configHubClientId": "admin",
"configHubClientSecret": "******",
"uaaClientId": "admin",
"uaaClientSecret": "******",
"selectedPackageProducts": [
{
"productName": "Configuration Hub",
"installType": "installText"
},
{
"productName": "Proficy Authentication",
"installType": "installText",
```

```
"uaaInstallType": "Silent Install"

},

{

"productName": "License Server Tool",

"installType": "upgrade",

"installedLocation": "C:\\Program Files (x86)\\Proficy\\Proficy Common\\Proficy Common Licensing"

}

],

"isAuthCredsProvided": false,

"rebootFlag": false

}
```

SCADA Client

```
{

"packageSelected": "ScadaClient",

"installLocation": "C:\\Program Files (x86)\\Proficy",

"selectedPackageProducts": [

{

"productName": "iClient",

"installType": "installText"

},

{

"productName": "Productivity Tools",

"installType": "installText"

},

{

"productName": "Historian Client Tools",

"installType": "installText"

},

{

"productName": "Proficy Webspace",

"installType": "installText"

}

],

"nodeName": "FIXVIEW"

"historianServerLocation": "10.10.01.10",

}
```

SCADA Standalone Server

```
{
"packageSelected": "ScadaStandAloneServer",
"installLocation": "C:\\Program Files (x86)\\Proficy",
"nodeName": "FIX",
"selectedPackageProducts": [
{
"productName": "SCADA",
"installType": "installText"
},
{
"productName": "Industrial Gateway Server [IGS]",
"installType": "installText"
},
{
"productName": "Productivity Tools",
"installType": "installText"
},
{
"productName": "Historian Collectors",
"installType": "installText"
},
{
"productName": "Historian Server",
"installType": "installText"
}
],
"dataPathFolder": "C:\\Proficy Historian Data",
"enableCertificateSecurity": false,
"serverCertPassPhrase": "",
"isAuthCredsProvided": false,
"rebootFlag": false
}
```

SCADA with Remote Historian

```
{
"packageSelected": "ScadaWithRemoteHistorian",
```

```
"installLocation": "C:\\Program Files (x86)\\Proficy",
"selectedPackageProducts": [
{
"productName": "Interop Service",
"installType": "installText"
},
{
"productName": "SCADA",
"installType": "installText"
},
{
"productName": "Industrial Gateway Server [IGS]",
"installType": "installText"
},
{
"productName": "Productivity Tools",
"installType": "installText"
},
{
"productName": "Historian Client Tools",
"installType": "installText"
},
{
"productName": "Historian Collectors",
"installType": "installText"
}
],
"nodeName": "FIX",
"dataPathFolder": "C:\\Proficy Historian Data",
"historianServerLocation": "MYSERVER",
"historianUserName": "admin",
"historianPassword": "******",
"isAuthCredsProvided": false
}
```


Historian Server

```
{
"packageSelected": "HistorianServer",
"installLocation": "C:\\Program Files (x86)\\Proficy",
"selectedPackageProducts": [
{
"productName": "Historian Server",
"installType": "installText"
}
],
"dataPathFolder": "C:\\Proficy Historian Data",
"enableCertificateSecurity": false,
"serverCertPassPhrase": "",
"isAuthCredsProvided": false
}
```

Operations Hub

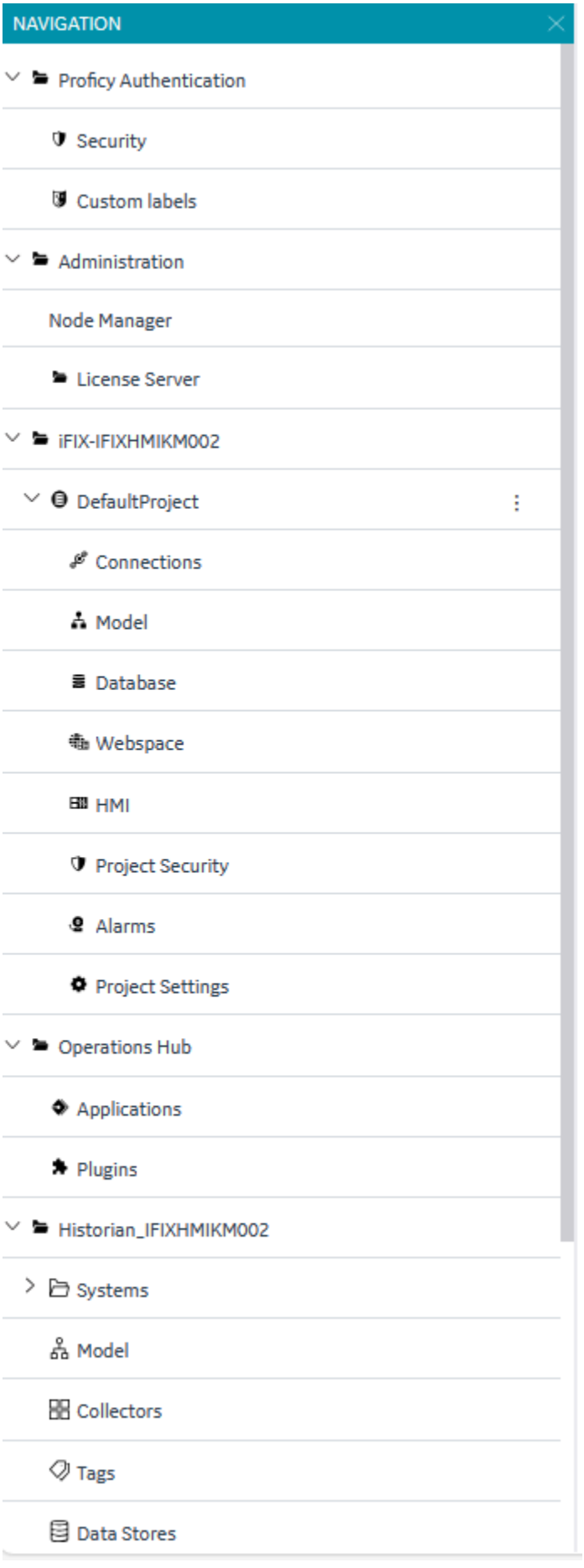
```
{
"packageSelected": "productOpsHub",
"installLocation": "C:\\Program Files (x86)\\Proficy",
"opshubusername": "ch_admin",
"opshubpassword": "******",
"ophub": {
"configHubRegClientId": "admin",
"configHubRegClientSecret": "******",
"uaaBaseUrl": "",
"adminClientId": "admin",
"adminClientSecret": "******",
"configHubBaseUrl": "",
"deferConfigHubRegistration": true,
"useLocalUaa": true
},
"opshubdrivelocation": "C:",
"selectedPackageProducts": [
{
"productName": "Operations Hub",
"installType": "installText",
"opshubinstalltype": "Silent Install"
```

```
}
],
"isAuthCredsProvided": false
}
```

Available Product Plugins

Overview

Configuration Hub is a framework where more than one Proficy product can be configured. Currently, you can register Proficy Authentication, iFIX, Historian, and Operations Hub "plugins" with Configuration Hub. When you log in to Configuration Hub, you will see the registered products in the navigation pane. For example, here is the navigation pane showing Proficy Authentication, iFIX, Operations Hub, and Historian.


NAVIGATION
Proficy Authentication
Security
Custom labels
Administration
Node Manager
License Server
iFIX-IFIXHMIKM002
DefaultProject
Connections
Model
Database
Webspace
HMI
Project Security
Alarms
Project Settings
Operations Hub
Applications
Plugins
Historian_IFIXHMIKM002
Systems
Model
Collectors
Tags
Data Stores

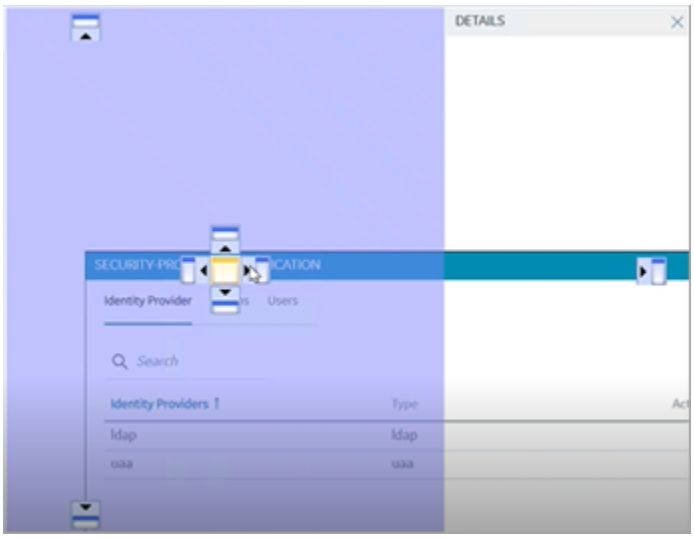
Common Panels

Common Panels

In the Configuration Hub IDE, there are two panels and a toolbar that are common across all products and instances. These panels are the Navigation panel and the Details panel. These panels are always available to re-open via the toolbar. For more information, refer to the following topics:

- Application Bar *(on page 40)*
- Navigation Panel *(on page 42)*
- Details Panel *(on page 44)*

You can make the panels float, and dock them either to the left, right, top, or bottom of the application window.



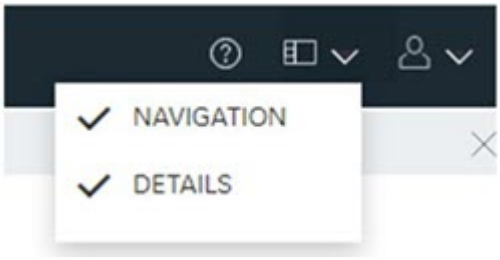
Application Bar

Configuration Hub has a common toolbar always at the top of the IDE. From this toolbar you can close and open the common panels (Navigation and Details) as well as access the Help and the User actions like Logout.

When configuring an iFIX node, a Home and Save button also appear on this toolbar.

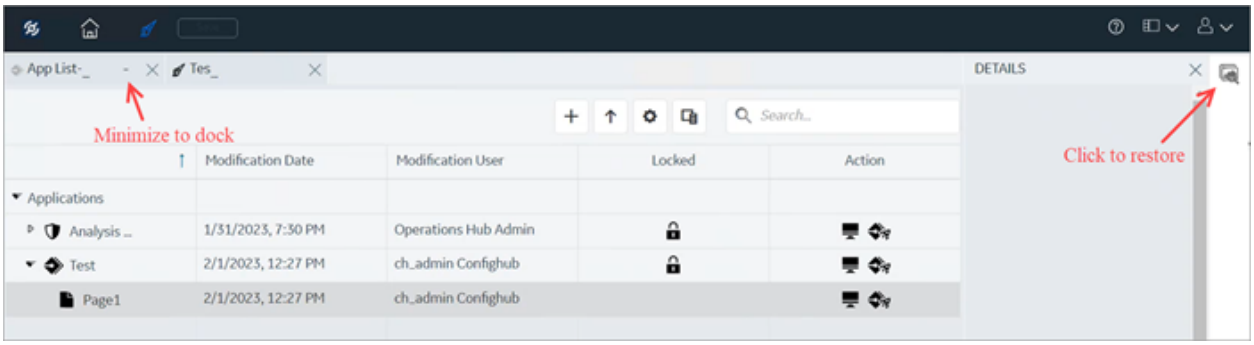
When working with Operations Hub, the paintbrush icon appears between the Home and Save button on the toolbar, so that you can switch between the following application modes appear on the toolbar:

- Designer Mode
- Configure Mode

Item	Description
	Use this button to return to the home view (Configure mode). In Configure mode, you remain connected to the Configuration Hub panels: Navigation and Details.
	When Operations Hub is used with Configuration Hub, use this button to enter Design mode for Operations Hub. In Designer mode, the Configuration Hub panels are disconnected to allow more work area for Operations Hub designer. The panels appear in this mode while designing pages. In Designer mode, a ribbon bar appears on the left side, wherein you can minimize and dock your items. To restore minimized items on the ribbon bar, click their respective icons. See figure below.
	Click to save your changes locally. These changes will not get pushed to the iFIX server until you publish them.
	Click to access the online help.
	Use this button to open or close a Navigation or Details panel. 
	Click to select Logout. This will end the current user session and load the launch page to select another plug-in. From a single browser ses-

Item	Description
	sion, a user can log into only one plugin at a time. For example, a user can log in to an iFIX node or Historian one.

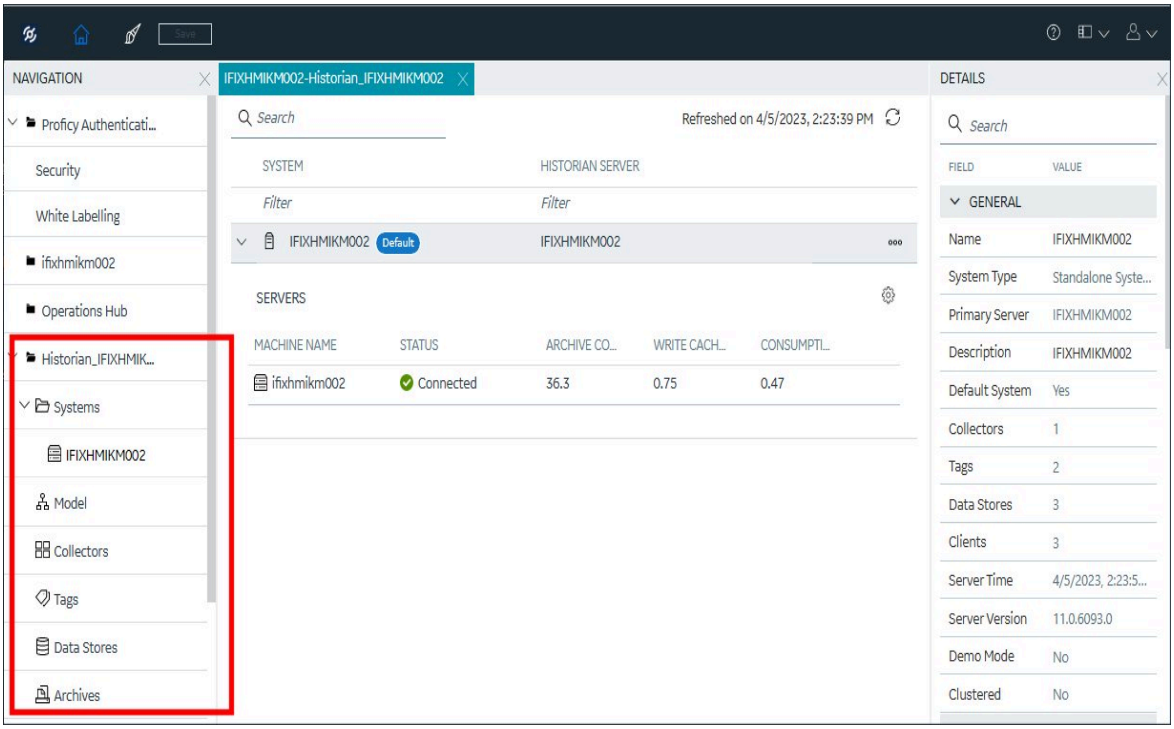
The following figure shows an example of Design mode, with Operations Hub installed:



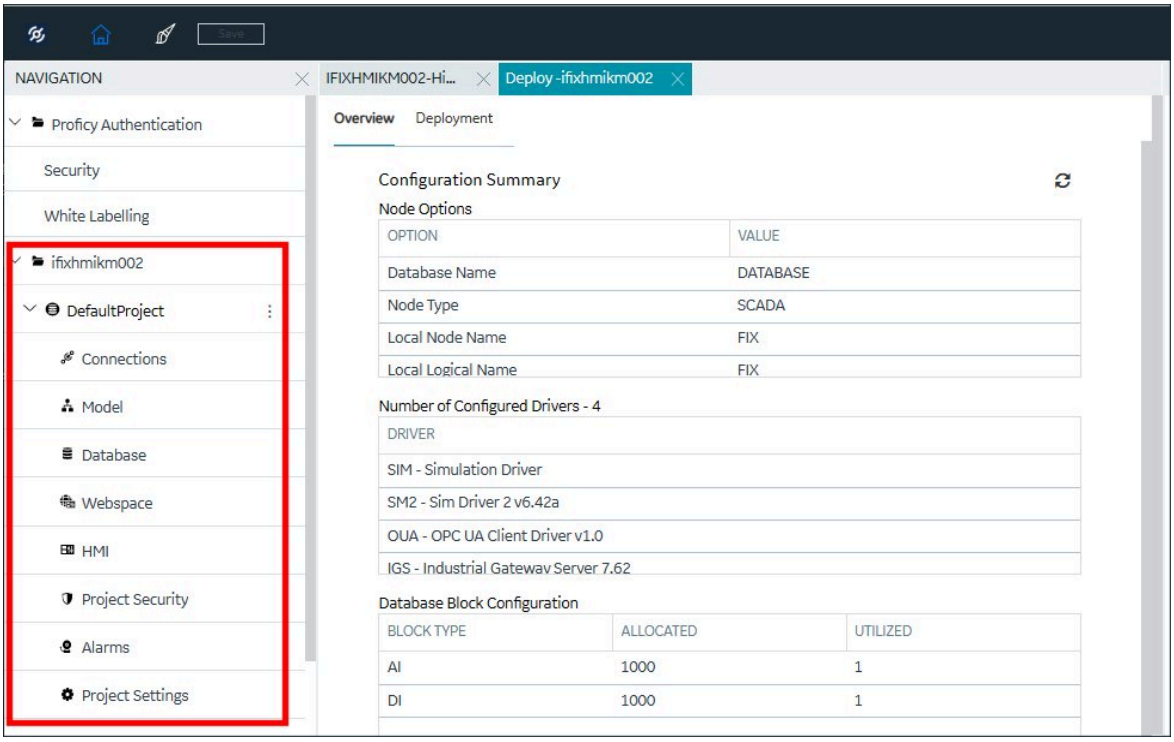
Navigation Panel

The Navigation panel contains the plugin instance of the name that you are currently logged into and the associated details. Examples are as follow:

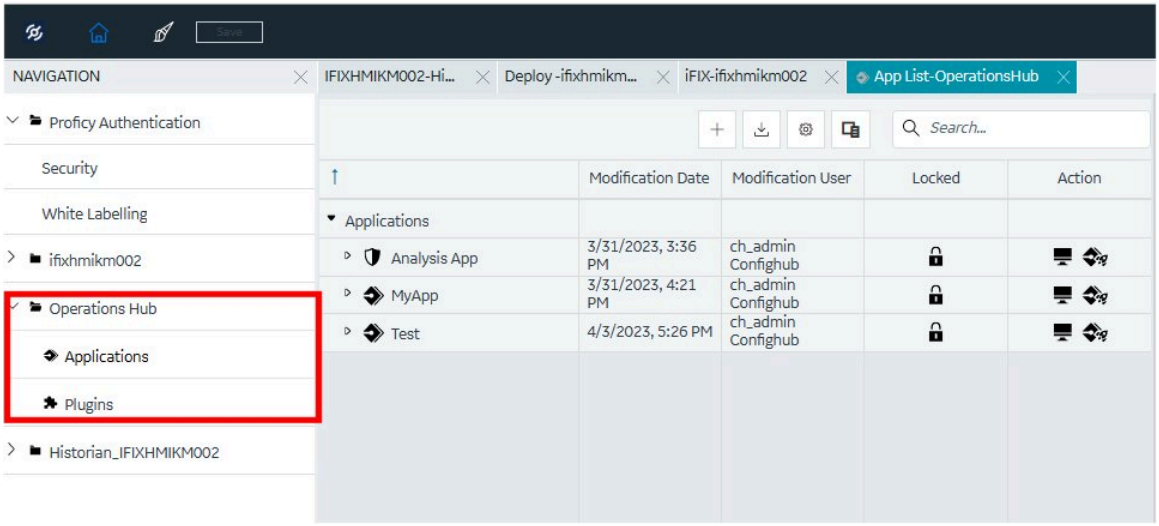
- For Historian, the Navigation panel includes the Systems configured by user. Systems will have Server details displayed. By default, there will be one system created. It also includes the Model, Collectors, Tags, Data Stores, Archives, Data, Alarms, and Activity Logs.



- In the case of iFIX, the plugin name is the node name of your iFIX node. Under the node name, you will see a Default Project and Connections, Model, Database, Webspace (if Webspace is installed and configured), HMI (if Operations Hub is installed and configured), Project Security, Alarms, and Project Settings panels.



- In the case of Operations Hub, you will see an Applications and Plugins panels.

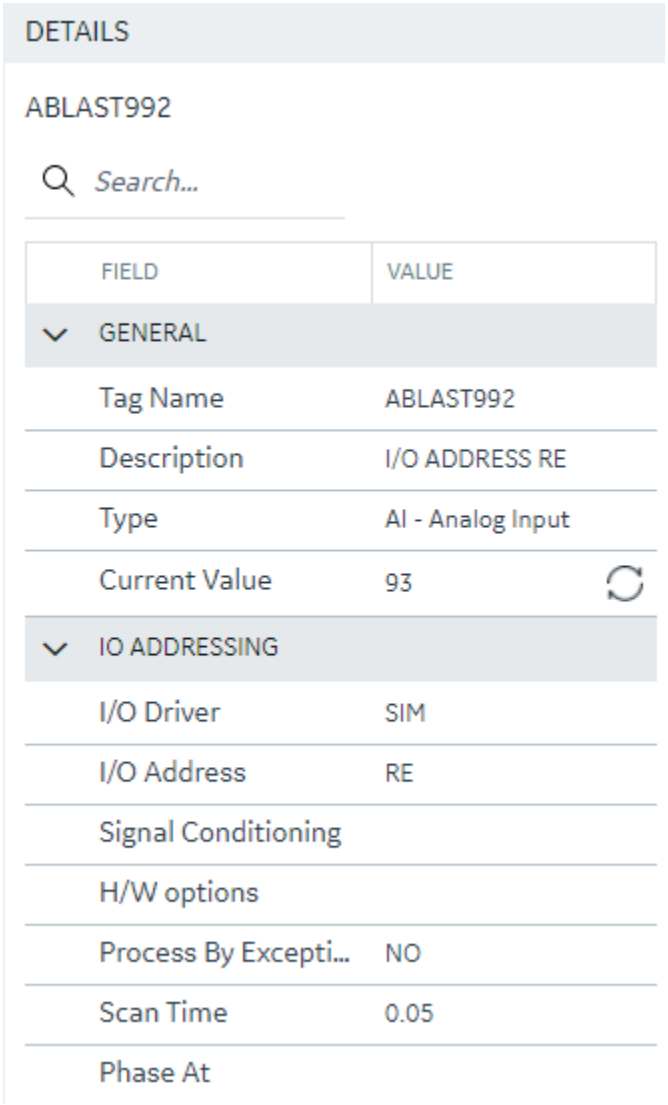


Depending on the product, the Navigation panel will have different options available to open and configure.

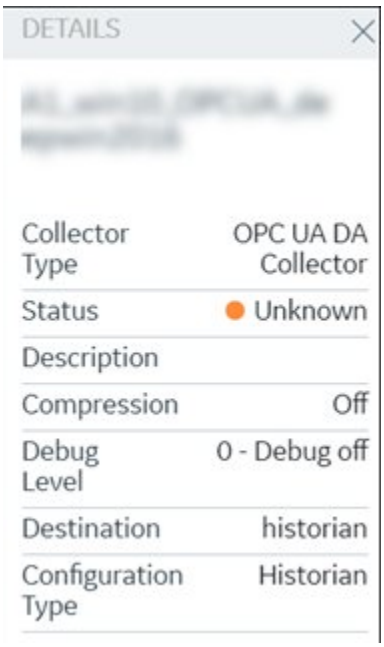
Details Panel

The Details panel is a companion panel that responds and works with the currently active panel in the IDE.

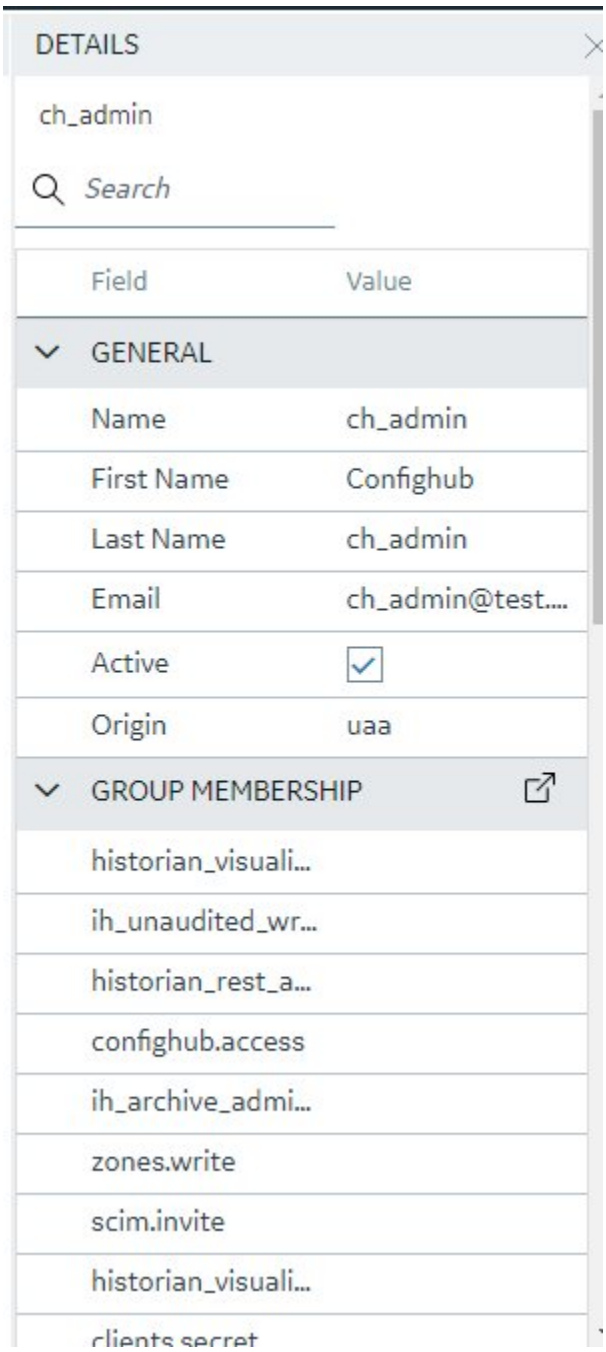
For example, if you are configuring the iFIX Database panel, the Details panel will show the tag property grid for the currently selected tag.



For Historian, the Details panel will show the various details pertaining to Collectors and Servers at this point of time. You will be able to take some actions from this pane as well.



For Proficy Authentication, the Details panel will show properties for identity providers, groups, and users. The following example shows the details of the default user, ch_admin:



Concurrency Management

One of the advantages to a browser-based tool is that more than one user can access the system at the same time. Configuration Hub supports this generally with some of the following considerations:

Generally

- Working on one plugin has no overlap with working on a different plugin in terms of different users overwriting each other's work.

iFIX

- An iFIX node can only ever have one active database, so changes resulting from the Publish operation to the running database will be reflected across every browser session.
- The Unpublished changes on any given node are common to all browser sessions accessing that node. So, a user on one browser adding tags, importing tags, modifying, and adding to the model and so on will affect what a user in a different browser session working on the same node will see. For example, if one user imports 1000 tags into the database, a second user looking at the same Database panel will see those tags appear in their panel even though they have not yet been published to the running iFIX SCADA system.
- If a user is in the middle of changing anything in iFIX that requires a "Save" operation, they will be prompted to save and refresh if the database is changed from any other source.
- Generally, you should avoid importing from more than one session at the same time. Though this is supported from the Data panel, it will slow down performance drastically to have multiple imports happening simultaneously.

Historian

- Changes resulting from a Publish operation will be reflected across every browser session.
- If an item is changed from any other source while a user is in the middle of making a change in Historian that requires a "Save" operation, the user will be prompted to save and refresh.

Node Management

Node Manager - Administration

The Node Manager centralizes control over product details, license activations, and certificate management.

The following topics help you to efficiently perform actions in the Node Manager-Administration panel:

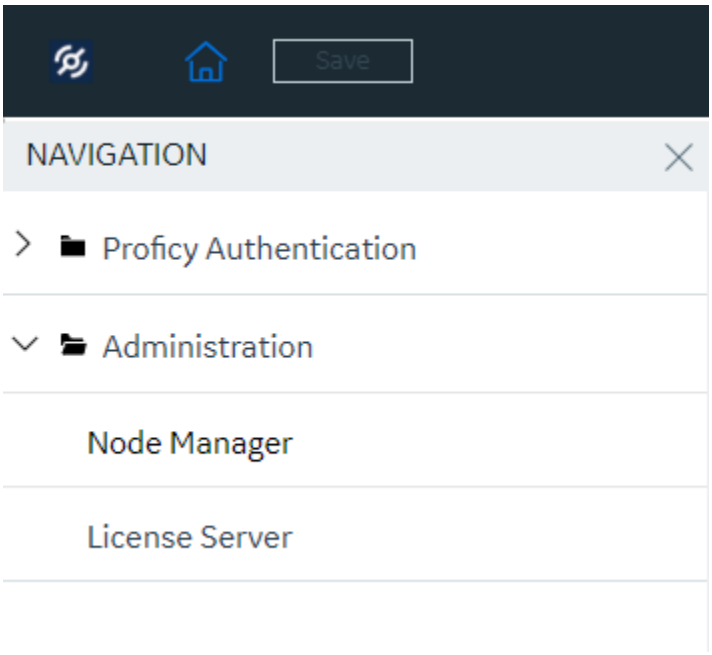
- Adding a Node Manager *(on page 49)*
- Removing a Node Manager *(on page 51)*
- Node Manager Details and Actions *(on page 54)*
- Product Details and Actions under Node Manager *(on page 60)*

Adding a Node Manager

Adding a node manager to the **Node Manager-Administration** panel provides a comprehensive list of installed product nodes on your machine. This panel offers centralized control for managing installed Proficy product(s).

1. Log into Configuration Hub with Proficy Authentication credentials.

   The NAVIGATION panel appears.



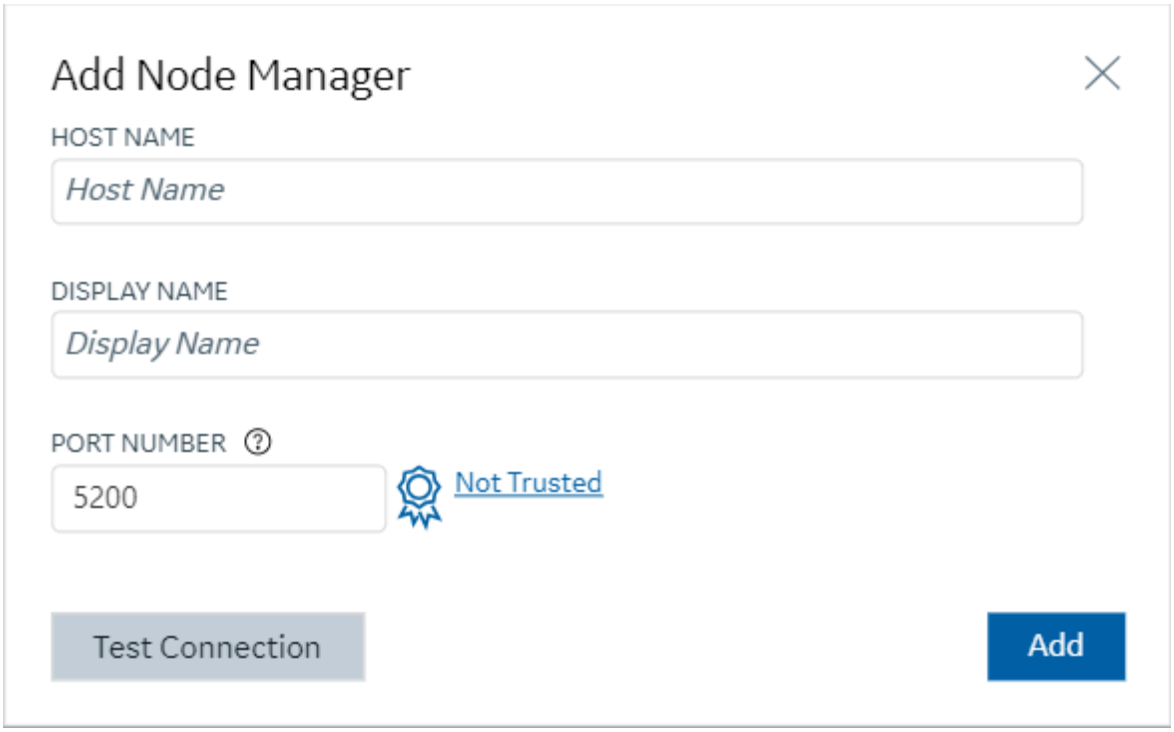
2. In the NAVIGATION panel, select > **Administration**.

   The Node Manager and License Server panels appears.

3. Select **Node Manager**.

   The **Node Manager-Administration** panel appears displaying the Configuration Hub and Proficy Authentication product details.

4. Select + to add the Node Manager.



The **Add Node Manager** window appears. Enter the following details:

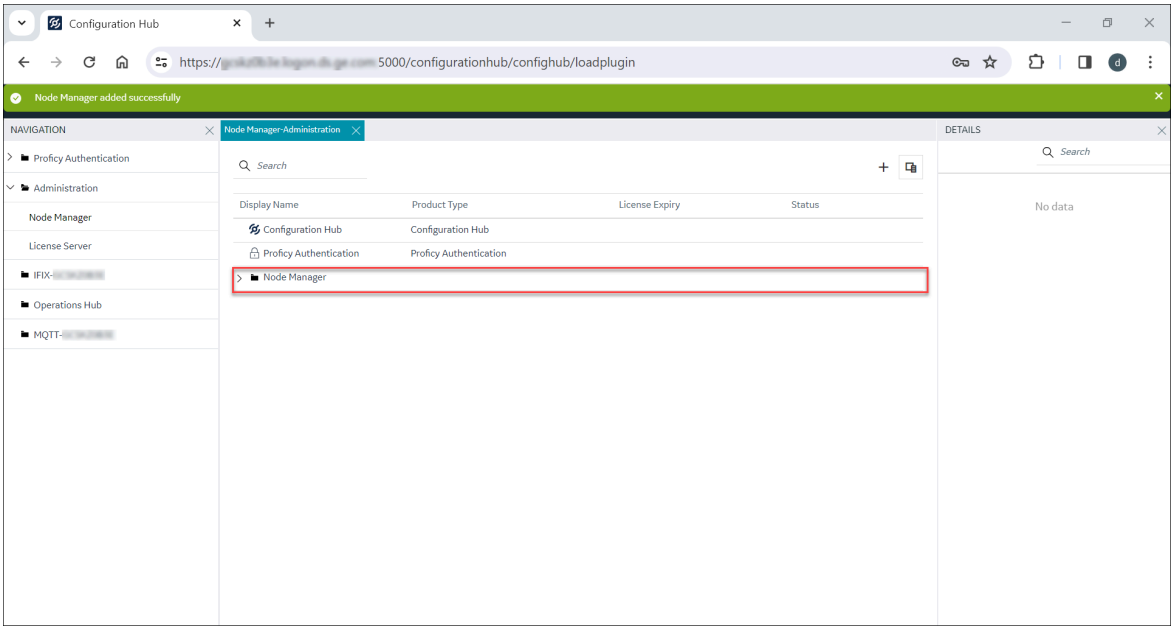
- **HOST NAME:** The name of the node server where the product is installed. In the <Fully Qualified Domain Name> format.
- **DISPLAY NAME:** The display name is automatically populated, reflecting the host name field. You can choose to edit the display name as needed.
- **PORT NUMBER:** The node manager port number where the product is installed.

5. If the root certificate of the Node Manager is not trusted:
   - Click **Not trusted**.

     The **Certificate Details** page appears.
   - Click **Trust**.

   The root certificate is **Trusted**.
6. Select **Add**.

   The *Node Manager added successfully* message appears.



Note:

You can select > of the Node Manager row to view the product(s) installed on the node machine. Refer to Product Details and Actions under Node Manager *(on page 60)* for more information.

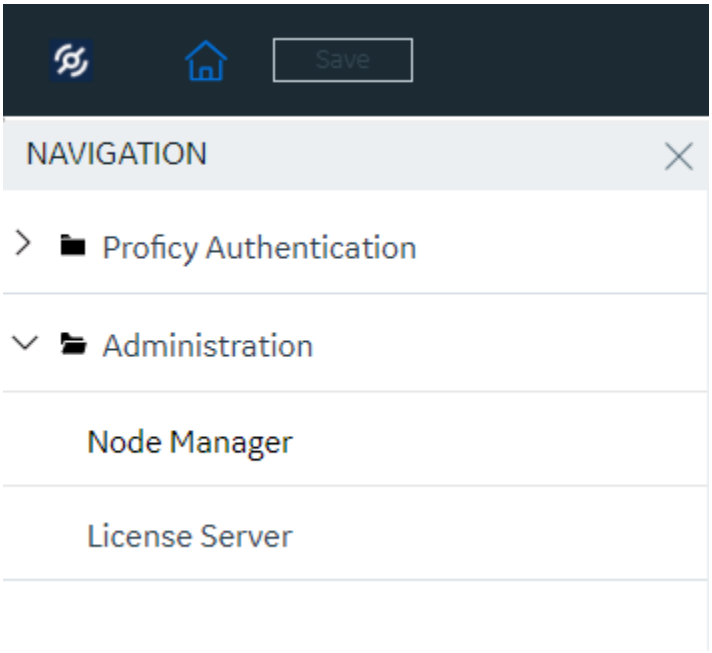
Additionally, within the DETAILS panel, you can manage product details, license activation, certificate details, and other necessary information. Refer to Node Manager Details and Actions *(on page 54)* for more information.

Removing a Node Manager

Procedure

1. Log into Configuration Hub with Proficy Authentication credentials.

   The NAVIGATION panel appears.



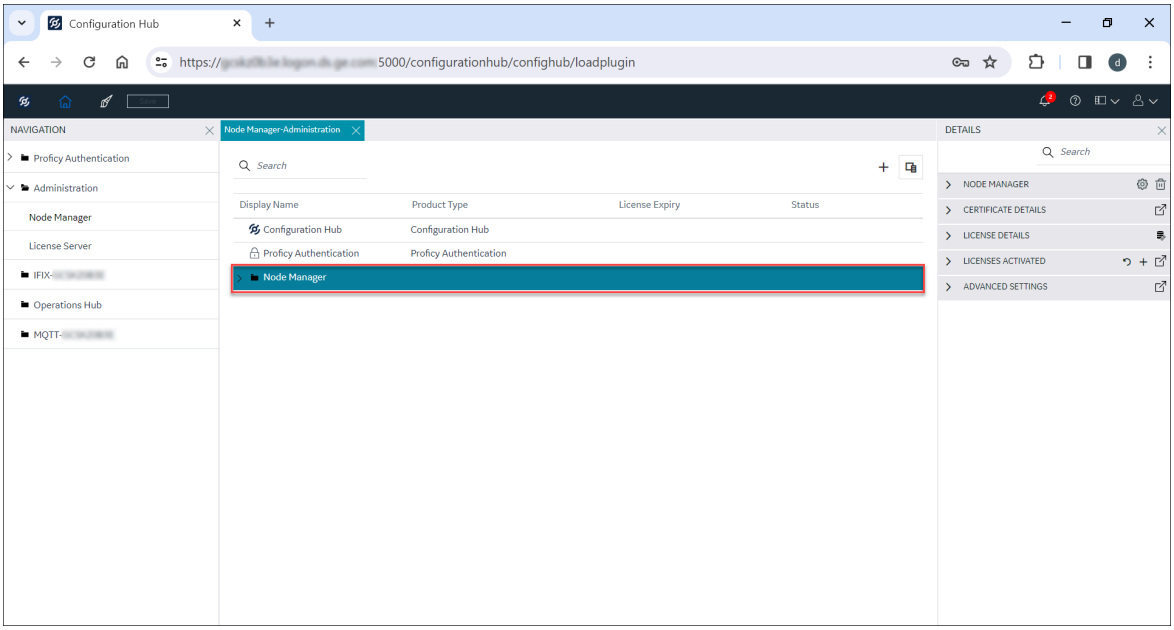
2. In the NAVIGATION panel, select > **Administration**.

   The Node Manager and License Server panels appear.

3. Select **Node Manager**.

   The **Node Manager-Administration** panel appears, displaying the Configuration Hub, Proficy Authentication product details, and the Node Manager row.

4. Select the Node Manager row.



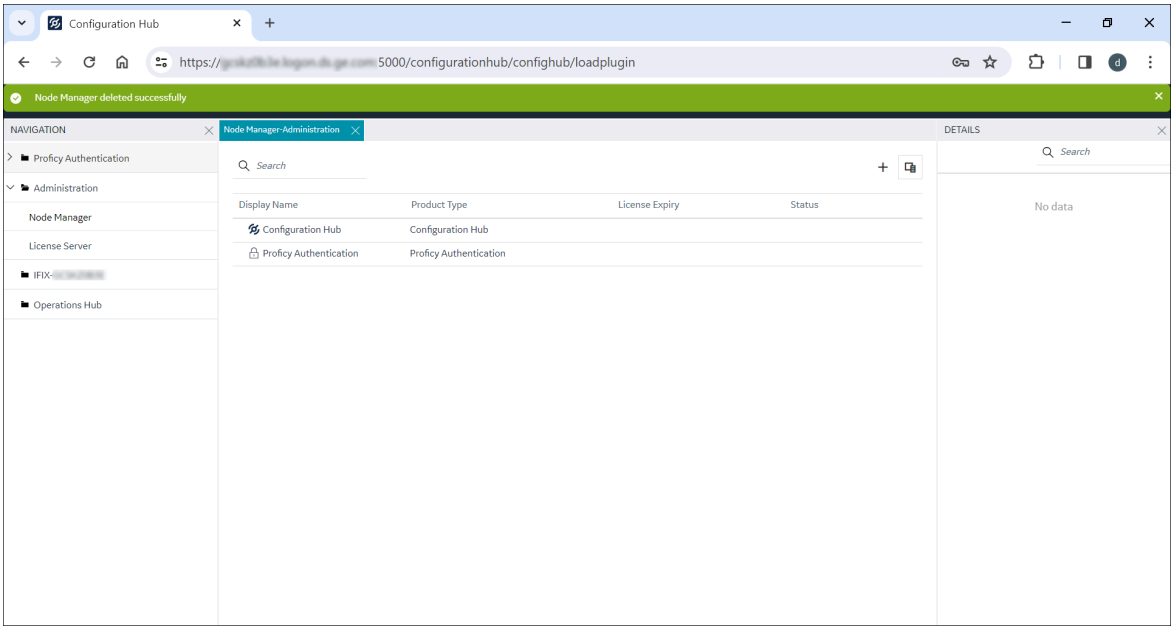
5. In the DETAILS panel, within the **NODE MANAGER** details section, select the **Delete** button.

   The **Delete Node Manager** window appears.

6. Select **Continue**.

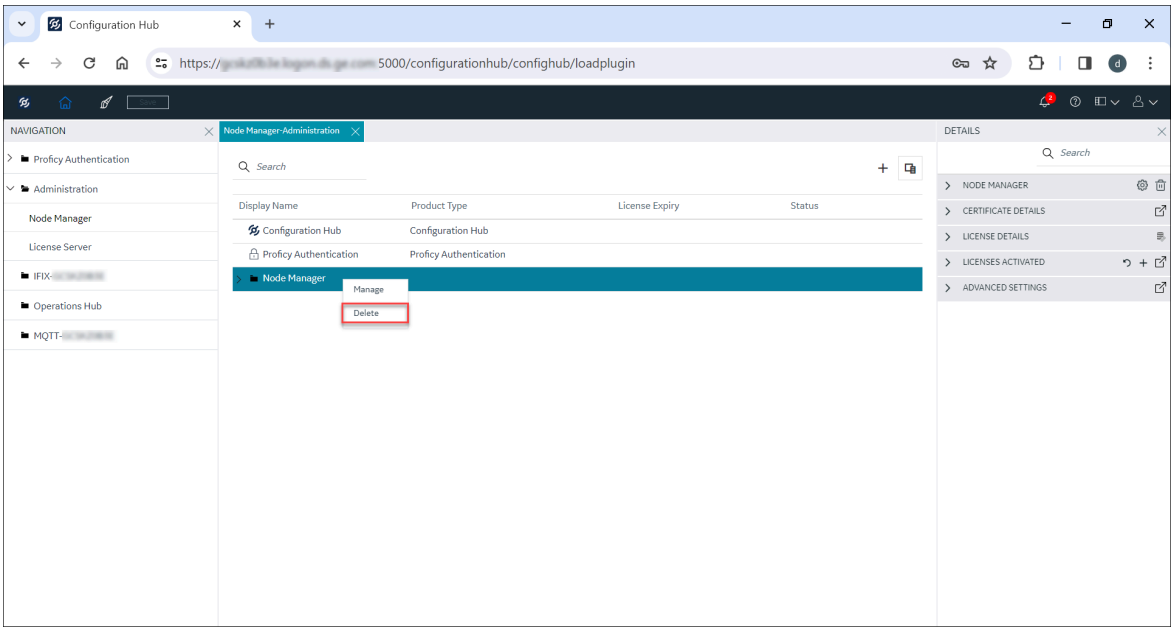
> **Note:**
> If you want to unregister all the plugins on the selected node from the Configuration Hub, you can select the check box in the Delete Node Manager window.

The *Node Manager deleted successfully* message appears, and the Node Manager row is removed from the **Node Manager-Administration** panel.



Note:

You can also right-click on the Node Manager panel row and select **Delete** to perform actions similar to those in the Node Manager details section within the DETAILS panel.



Node Manager Details and Actions

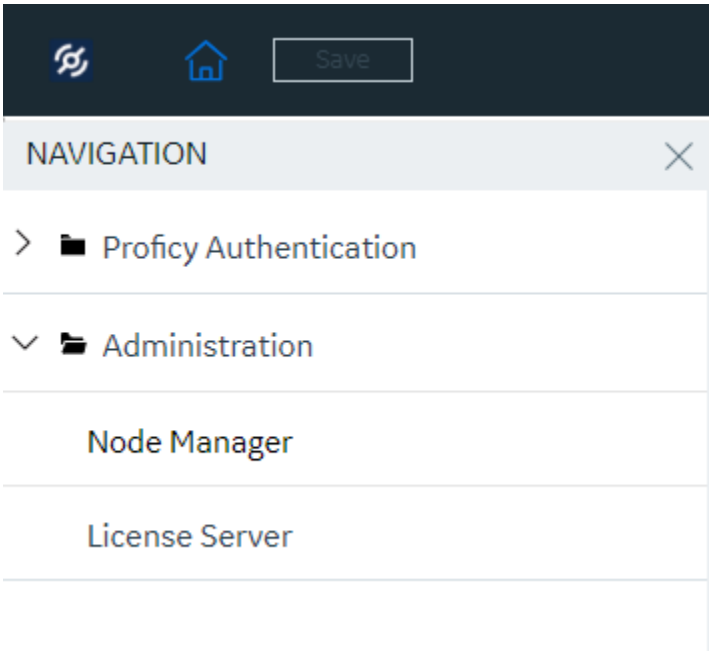
The Node Manager in the **Node Manager-Administration** panel enables you to view and manage various product details, including certificate details, product activation, and license details.

Procedure

You must set up the Node Manager to integrate the products on the node and establish the connection within Configuration Hub. To setup and manage the Node manager details in the Node Manager-Administration panel:

1. Log into Configuration Hub with Proficy Authentication credentials.

   The NAVIGATION panel appears.



2. In the NAVIGATION panel, select > **Administration**.

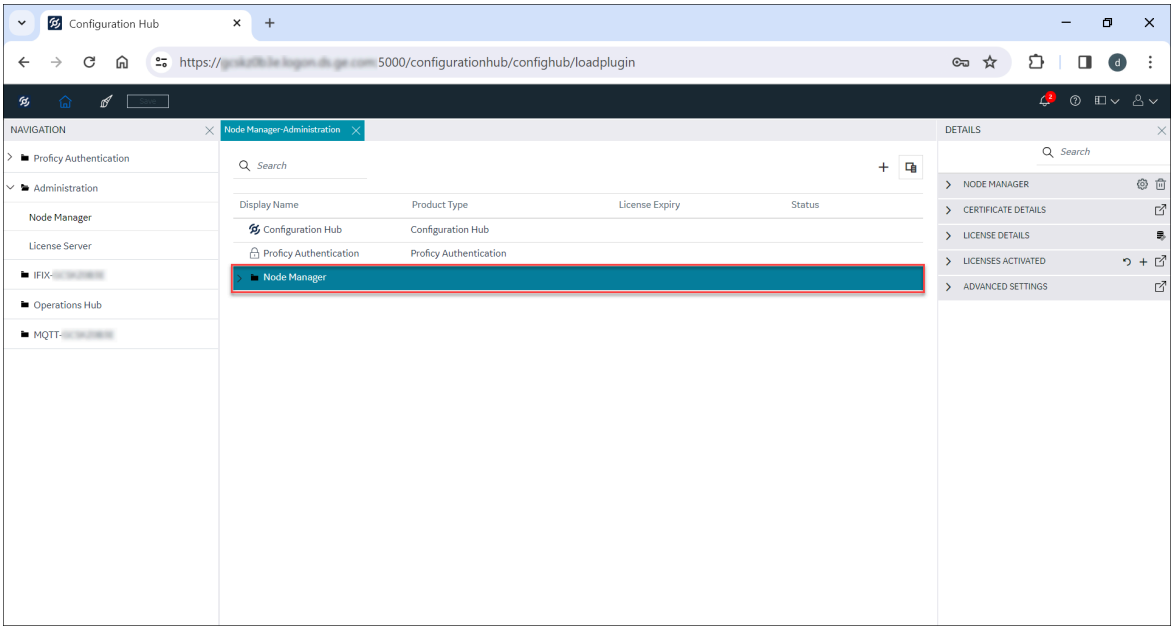
   The Node Manager and License Server panels appear.

3. Select **Node Manager**.

   The Node Manager-Administration panel appears, displaying the Configuration Hub, Proficy Authentication product details, and the Node Manager row.

   > **Note:**
   > Add Node Manager *(on page 49)* to the **Node Manager-Administration** panel if it is not already added.

4. Select the Node Manager row.

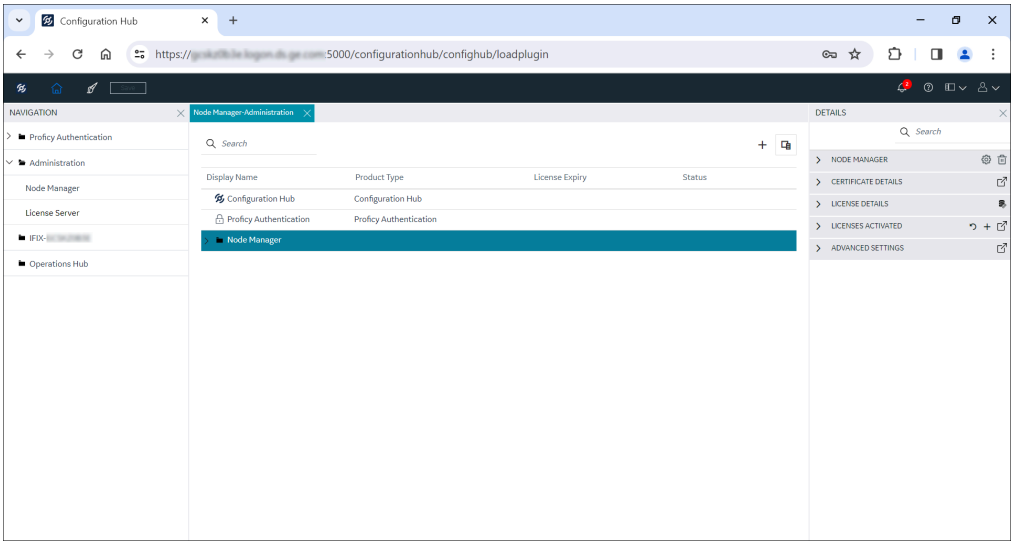


You can perform the following actions in the DETAILS panel:

- **NODE MANAGER:** Select > of the **NODE MANAGER** and, if required, edit the Display Name field to update the Node Manager display name.

> **Note:**
> You can modify the Node Manager display name only after adding the Node Manager.

- Select the **Manage** button.



The **Manage Plug-ins** window appears displaying the **Products Installed**. Select the checkbox against the product, and then select **Register** to register the plugin to Configuration Hub, or **Unregister** to unregister the plugin from Configuration Hub, or **Update** to modify the display name of plugin as required. Only after registering a product, the product plugin will appear in the **Administration** panel.

- Select the **Delete** button to remove the node manager from the **Node Manager-Administration** panel. Refer to Removing a Node Manager *(on page 51)* for more details.

◦ **CERTIFICATE DETAILS:** The Configuration Hub certificate details are displayed. For more information, refer to Server Certificates for Configuration Hub *(on page 67)*.

◦ **LICENSE DETAILS:** The product(s) license details are displayed. Also, the license establishment through Local License Server or Cloud Server will be indicated.

> **Note:**
> If the activation code for the Proficy product license is added using the Local License Server (refer to Adding an Activation code to the Server *(on page 104)*) then the server connection is established through Local License Server, and hence only the Local License Server icon will be appeared.

◦ **LICENSES ACTIVATED:**

- Select the **View Licenses** button.

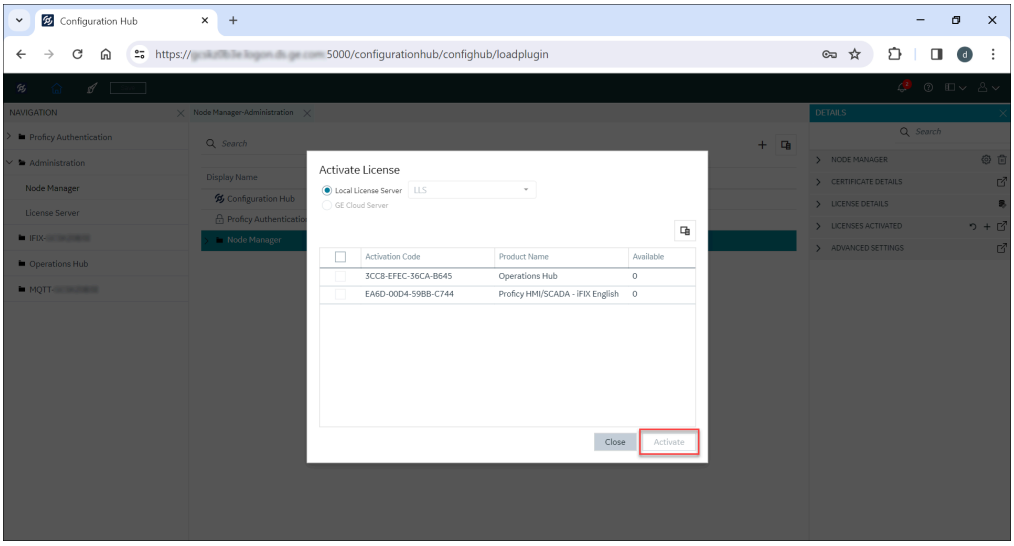
  The **Licenses Activated** window appears indicating the list of product licenses activated. If required, select **Clean** to clean the unused product licenses.

- Select the **Activate License** button.

  The **Activate License** window appears to activate the product licenses.

> **Note:**
>
> You must establish a connection to either of these servers (Local License Server or Cloud Server). You can establish the server connection by clicking on Local License Server or Cloud server below the License Server-Administration panel. However, you are restricted to connecting to only one server at a time. When connected to the Local License Server, you will be able to retrieve licenses stored there. On the other hand, if connected to the Cloud Server, you will have access to licenses available for activation on that server. If you have already added activation codes using the Local License Server, the network connectivity to the Cloud Server will be disabled. When you add a Local License Server (refer to Adding a Local License Server *(on page 102)* for more details) and added activation code(s) for the Proficy product licenses to the Local License Server (refer to Adding an Activation code to the Server *(on page 104)*) then the server connection is established through Local License Server, and hence the Cloud Server will be disabled for any activation of product licenses from the cloud server. Also, in the **Activate License** window, only the activation codes added to the Local License Server are retrieved and displayed in the grid for Proficy product license(s) activation.

> **Important:**
>
> To activate activation codes from the Cloud Server, ensure that the Local License Server connection is not established in Configuration Hub. You can achieve this by not adding the Local License Server in the Node Manager-Administration panel. This will allow you to add the product activation codes from the Cloud Server and activate them.



Check the checkbox for the product activation code corresponding to the product(s), and then select **Activate** to activate the product licenses.

You can click the Column Chooser option to customize the columns in the table according to your preferences.

- Select **Column Chooser**.

  The **Column Chooser** window appears.

- Choose the columns that you want to view in the table by selecting the checkboxes next to them (Activation Code, Product Name, Available, and Description) or unselect the checkbox if you do not want to view it.
- Select to close the Column Chooser window.

  The selected columns will be displayed on the table.

- Select the **Return Licenses** button.

The **Return License** window appears displaying a list of product licenses categorized as either in use or unused, corresponding to their respective product activation codes. Check the Activation Code checkbox in the **Applied Licenses** grid to select the applied licenses for each product. Uncheck any product licenses that you do not want to return, and then select **Return**. This process will return the selected license(s) to the server from which they were originally applied, whether its the License server or Cloud Server. However, you can retrieve the returned product licenses and their activation codes from the server where you initially applied the licenses.

- **ADVANCE SETTING:**
  - Select  .

    The **Configure server proxy** window appears. If required, you can modify the proxy server details and select **Apply** to establish the proxy server.

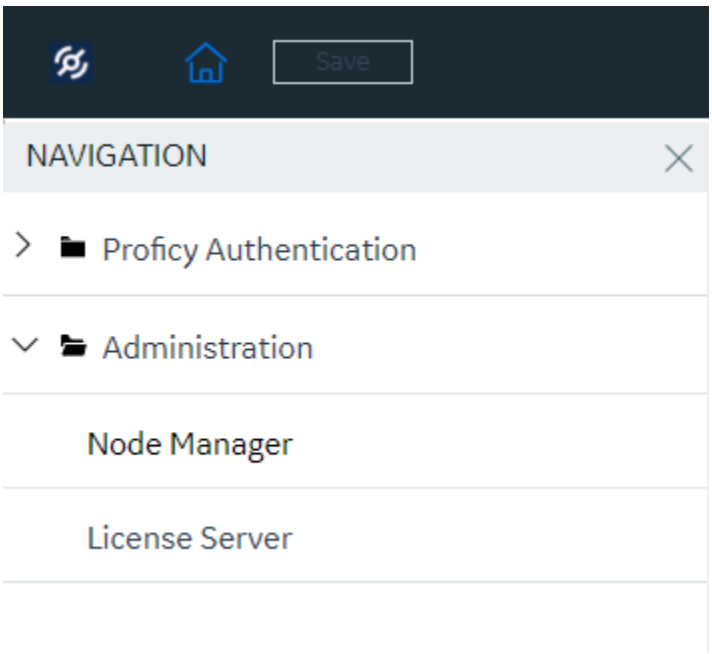
Product Details and Actions under Node Manager

Within the **Node Manager-Administration** panel of the Configuration Hub, you can centrally control and manage the installed Proficy product(s) on the node machine. This facilitates easy registration and unregistration, as well as handling certificate requirements.

Procedure

1. Log into Configuration Hub with Proficy Authentication credentials.

   The NAVIGATION panel appears.

2. In the NAVIGATION panel, select **Administration**.

   The Node Manager and License Server panels appear.

3. Select **Node Manager**.

The Node Manager-Administration panel appears, displaying the Configuration Hub, Proficy Authentication product details, and the Node Manager row.

> **Note:**
> Add Node Manager *(on page 49)* to the **Node Manager-Administration** panel if it's not already added.

4. Select > of the Node Manager row in the **Node Manager-Administration** panel.

The list of Proficy product(s) installed on the node appears. Select the product row as required, the DETAILS panel display the product details. You can perform the following actions:

- **PLUG-IN:** Select > of the **PLUG-IN** and, if required, edit the Display Name field to update the product plugin display name.

  > **Note:**
  > You can modify the product plugin display name only after registering the product.

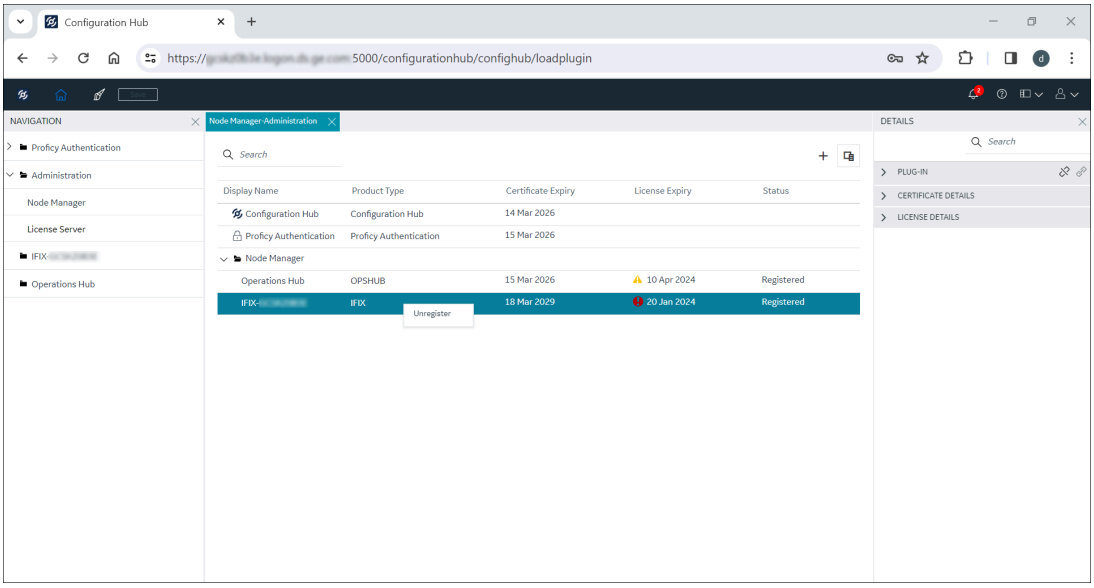
  - Select the **Register** button.

    The **Register Plug-in** window appears. The PLUGIN HOST, PRODUCT TYPE, and DISPLAY NAME fields are auto populated. Select **Register** to register the product.

  - Select the **Unregister** button.

    The **Unregister Plug-in** window appears. If you select **Continue** to unregister the product, the product plugin will be removed from the NAVIGATION panel. Also, any open panel belonging to this plugin will be closed, and changes to the product plugin will not be saved.

  > **Note:**
  > You can also right-click on the product row and select **Register** or **Unregister** as needed to perform actions similar to those in the PLUG-IN section within the DETAILS panel.



- **CERTIFICATE DETAILS:** Select > of the **CERTIFICATE DETAILS**. The Proficy product certificate details, such as Issuer Name, Valid From, Valid To, and others, are displayed.
- **LICENSE DETAILS:** Select > of the **LICENSE DETAILS**. The Proficy product license details, such as License Expiration, Licensed Version, Number of OPC Connections, Number of OPC UA Server Connections, Number of Web Server Connections, and others, are displayed.

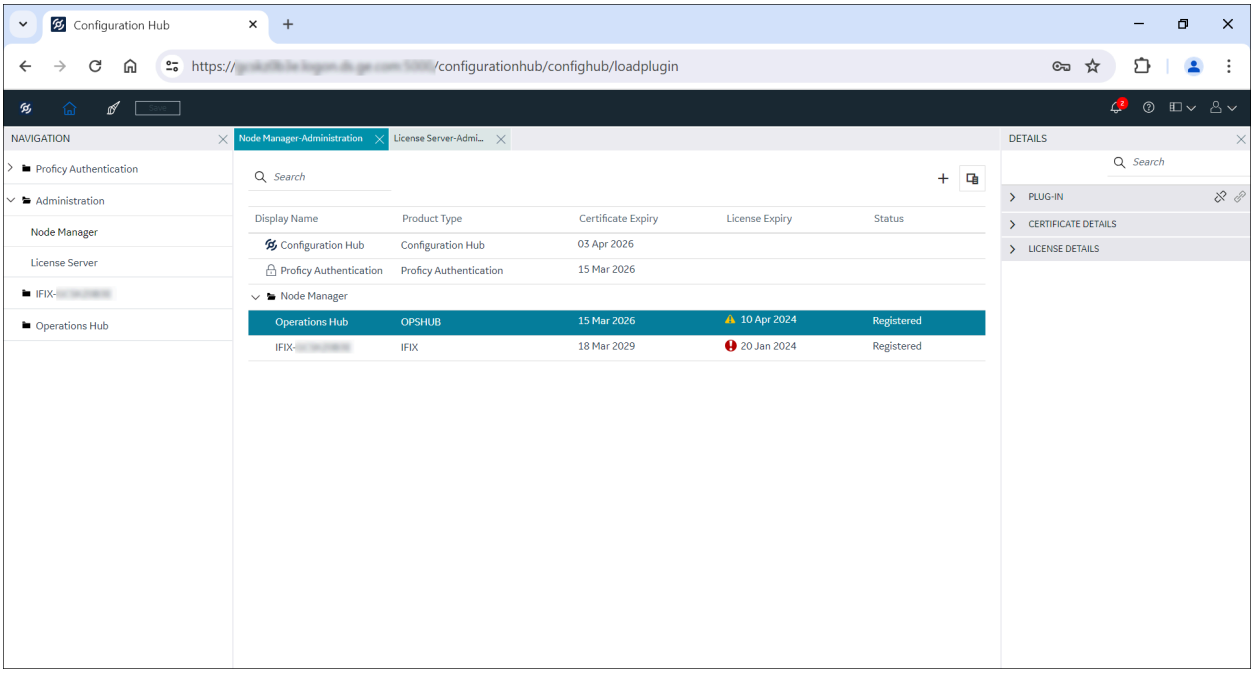
ARR Notifications and Product License Expiry

The Annual Recurring Revenue (ARR) notifications in Configuration Hub serve as timely indicators of license expiration information. When a product license is nearing expiration or has already expired, a banner is prominently displayed on the toolbar. This feature ensures that users are promptly notified about the status of their licenses, facilitating proactive management and timely renewals.

Priority: Medium

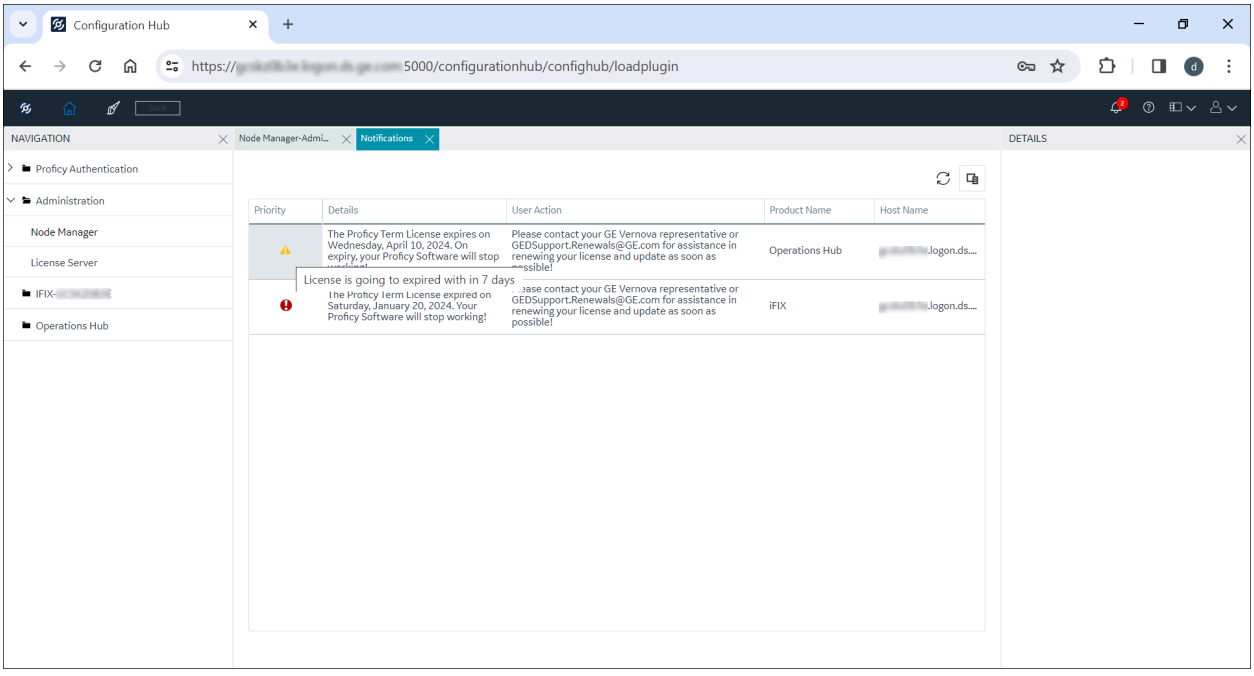
If a license is about to expire, which is considered medium priority, the license expiry warning is set to 90 days by default.

In the Node Manager-Administration panel, when you select > of the Node Manager row, the license expiry warning for the product approaching the earliest expiration date is indicated. Additionally, the LICENSE DETAILS section in the DETAILS panel will display the product license details, such as Creation Date, Expiration Date, License Type, and others.



On the toolbar, the notification count on the bell icon 

will be indicated with a red circle. The notification count specifies the number of product(s) that are approaching license expiration. Clicking the bell icon opens the Notifications panel, displaying license expiration details for the node term license, along with other information related to user actions on renewing the licenses.



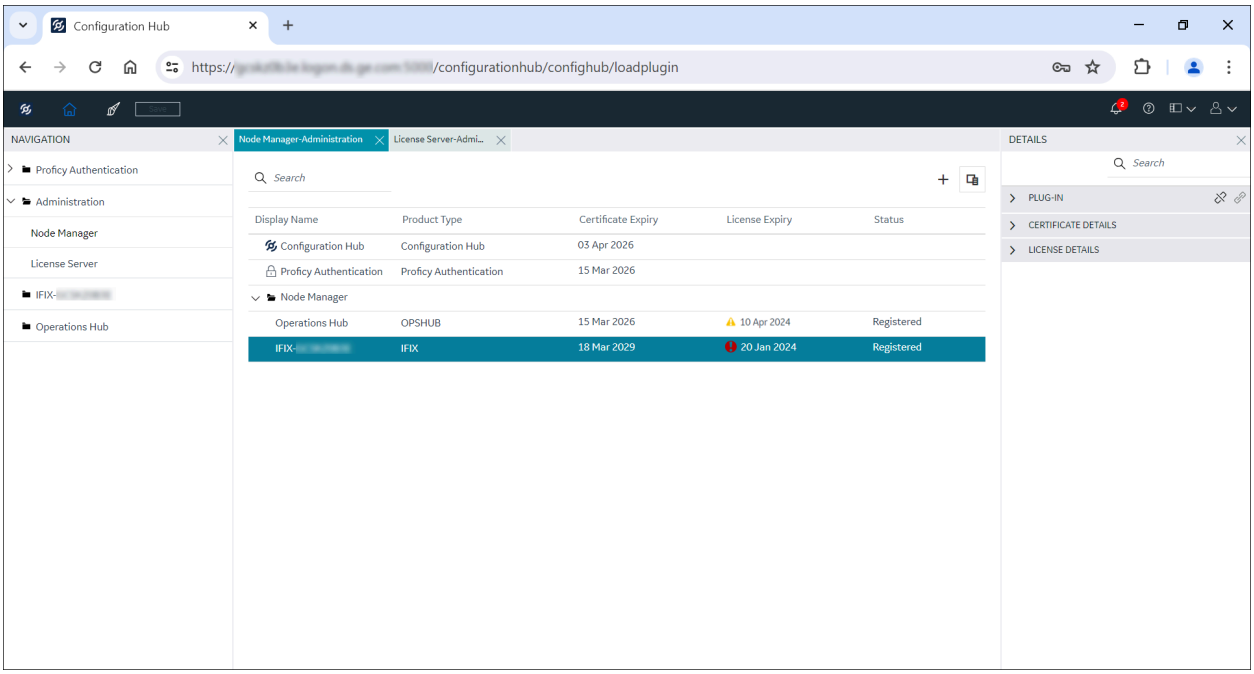
Hovering over the Priority column on the warning icon for a product triggers the following message:

License is going to expire with in <#number> of days.

Priority: High

If the license expires after the 90-day period, the warning is displayed in red, indicating high priority notification.

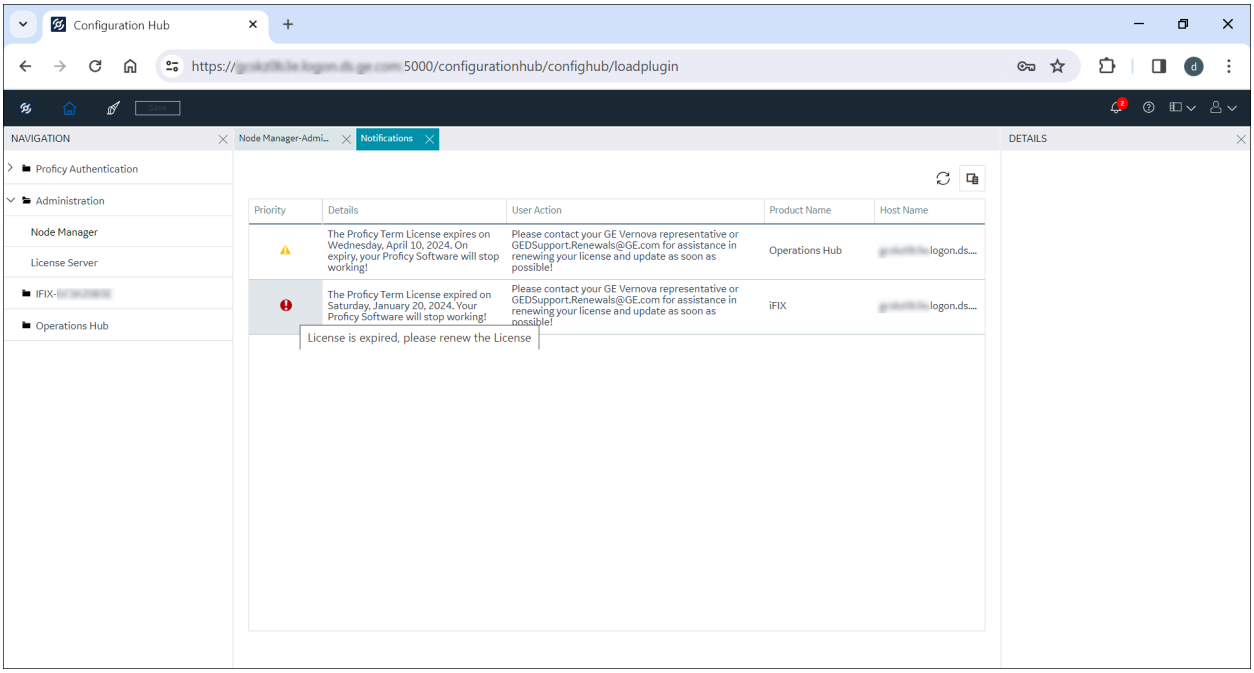
In the Node Manager-Administration panel, when you select ❯ of the Node Manager row, the license expiration warning with a red icon indicates that the product has expired. Additionally, the LICENSE DETAILS section in the DETAILS panel will display the product license details, such as License Expiration, Licensed Version, Number of Drivers Allowed, and others.



Note:
If a product license is already expired, upon logging into Configuration Hub or refreshing the browser, a prominent red banner appears conveying the following message:

CRITICAL: The Proficy Term License expired on one of the nodes. Dismiss this message and click on the bell icon on toolbar to view details.

Select ✕ to close the banner. Clicking the bell icon 2, opens the Notifications panel, displaying license expiration details for the node term license, along with other information related to user actions on renewing the licenses.



Hovering over the Priority column on the warning with a red icon for a product triggers the following message:

License is expired, please renew the License.

Refresh and Column Chooser

Clicking the Refresh button on the Notifications panel retrieves updated information regarding the product license expiration and other details in the table.

Additionally, you can also click the Column Chooser option to customize the columns in the table according to your preferences.

- Select **Column Chooser**.

  The **Column Chooser** window appears.
- Choose the columns that you want to view in the table by selecting the check boxes next to them (Priority, Details, User Action, Product Name, and Host Name) or clear the check box if you do not want to view it.
- Select to close the Column Chooser window.

  The selected columns will be displayed on the table.

License Header

The Proficy product licenses activated using the Local License Server will have a defined term license expiration date stored in the Local License Server. The details of the Proficy product term license expiration is displayed in the License Header. If the expiration date in the License Header is within seven days or is going to expire within seven days for any of the Proficy products activated on the node machine, a yellow notification banner will be displayed when you log in to Configuration Hub. This banner triggers the following message:

WARNING: The Proficy Term License is due to expire on one of the nodes. Dismiss this message and click on the bell icon on toolbar to view details.

Certificate Management

Certificate Management

The following sections explain how to manage your certificates for Configuration Hub, its clients, Proficy Authentication, and iFIX.

Steps for managing certificates are also described in the following sections:

- Server Certificates for Configuration Hub *(on page 67)*
- Client Certificates for Configuration Hub *(on page 73)*
- Proficy Authentication Certificate *(on page 83)*
- iFIX Certificates *(on page 83)*

Server Certificates for Configuration Hub

Server certificates for Configuration Hub are managed through the Configuration Hub interface.

Introduction

There are two types of Configuration Hub server certificates:

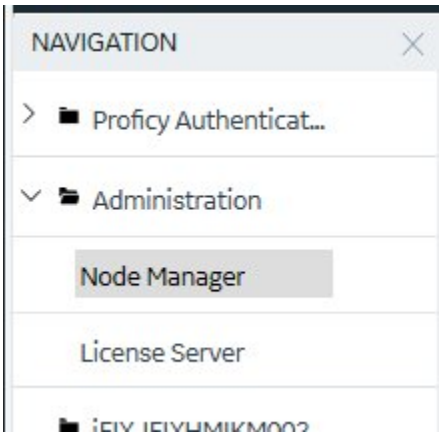
- Self-signed certificates (which are valid for a two-year period)
- External certificates (whose validity depends on the permission granted by the organization's software provider to the user)

Certificate expiration warnings for Configuration Hub are configured to alert users 15 days before and after expiration.

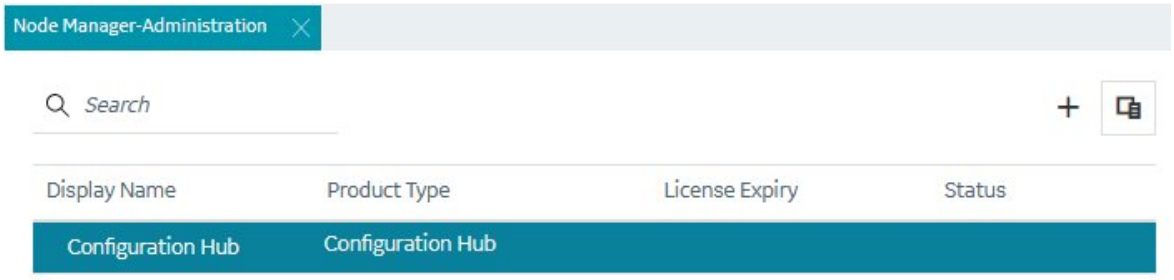
Check the Status of the Configuration Hub Server Certificate

Use the following steps to check the status of your Configuration Hub server-side certificate:

1. Log into Configuration Hub with Proficy Authentication credentials.
2. In Configuration Hub, from the **NAVIGATION** panel, open **Administration > Node Manager.**



3. In the Node-Manager-Administration screen, select the Configuration Hub row.
4. On the **DETAILS** panel, under **Certificate Details**, view the dates that the certificate is valid. For example, see the following figure which shows the valid date range from 2024-02-22 to 2026-02-21.



Note:

If the certificate is nearing expiration within the next 15 days, a warning indication will be displayed in the Certificate Expiry column. However, if the certificate expires after the 15-day period, a warning indication is displayed.

5. When a certificate expires, it must be updated. Use the following sections to update your server certificates.

Self-Signed Certificates for Configuration Hub

If the Configuration Hub self-signed server certificate has expired, use the following steps to update your self-signed certificates for Configuration Hub:

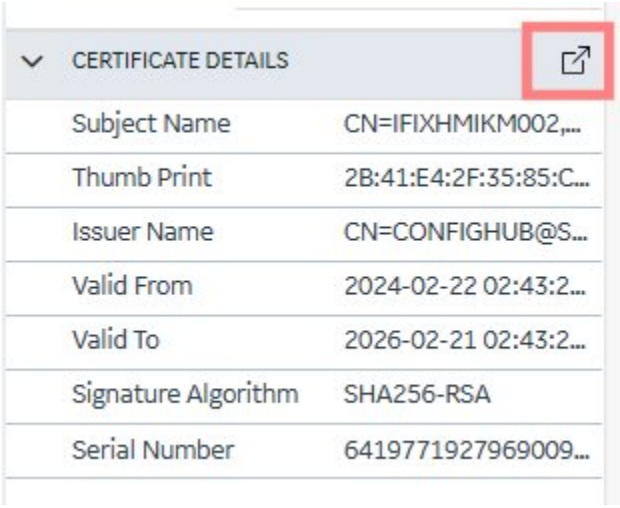
1. Log into the Configuration Hub with Proficy Authentication credentials.
2. From Configuration Hub, in the **NAVIGATION** panel, select **Administration**, and then select **Node Manager.**

   The **Node Manager-Administration** panel appears.

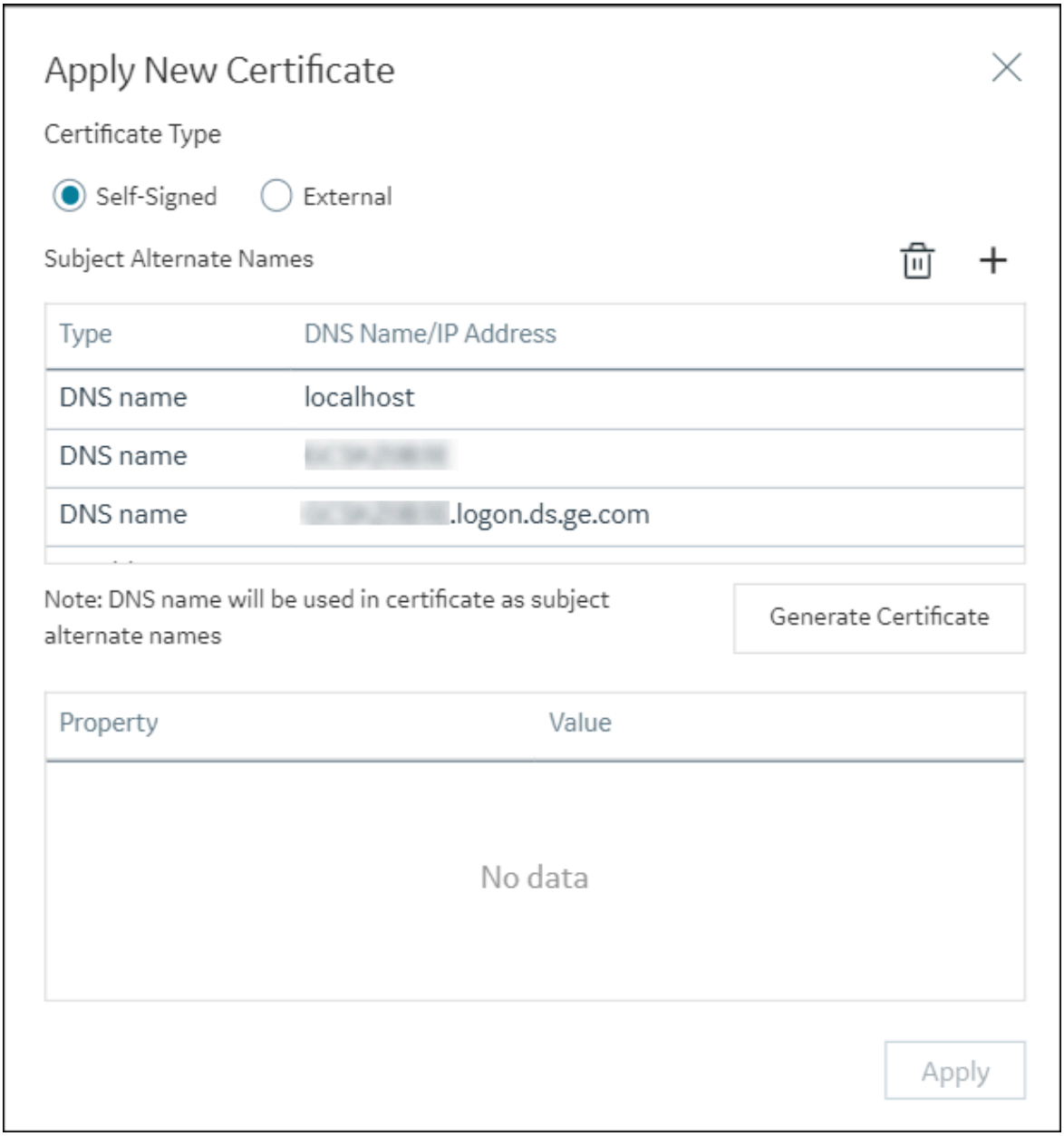
3. Select the Configuration Hub row.

   The DETAILS panel appears.

4. In the **CERTIFICATE DETAILS** section, click the **Generate Certificate** button.



The **Apply New Certificate** dialog box appears with Self-Signed selected as the default Certificate Type.



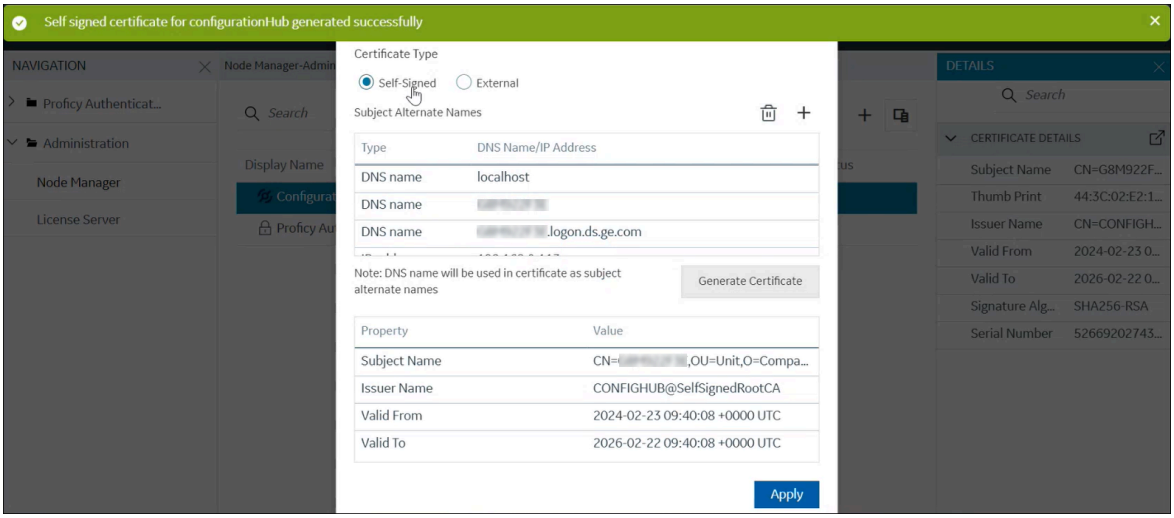
5. Leave the **Self-Signed** certificate type option selected.

   The Subject Alternate Names table displays available DNS name types and DNS/IP Address details. Optionally, modify these details as needed by selecting the Type from the drop-down list and update the DNS/IP Address column.

6. Click the **Generate Certificate** button.

   The *Self signed certificate for Configuration Hub generated successfully* message appears. Configuration Hub will then sign the certificate and it will generate a new one. The new certificate

will populate details such as Subject Name, Issuer Name, Valid From, and Valid To values in the grid, as shown in the following figure.



7. Click **Apply**.

   The *Certificates applied successfully* message appears.
   - The server certificate (server.crt and server.key) is automatically generated and saved in the location: `<ConfigurationHub home>\ConfigurationHub\Web\conf` and
   - The root certificate (CONFIGHUB@SelfSignedRootCA) is automatically stored in the Windows trusted store.

   > **Note:**
   > The CONFIGHUB@SelfSignedRootCA certificate in the Windows store will display the details such as Certificate expiration date, Issued to, Issued by, Subject alternate names, and others.

8. Restart the browser.

External Certificates for Configuration Hub

Use the following steps to configure an externally issued server certificate for Configuration Hub.

1. Log into the Configuration Hub with Proficy Authentication credentials.
2. From Configuration Hub, in the **NAVIGATION** panel, select **Administration**, and then select **Node Manager.**

   The **Node Manager-Administration** panel appears.

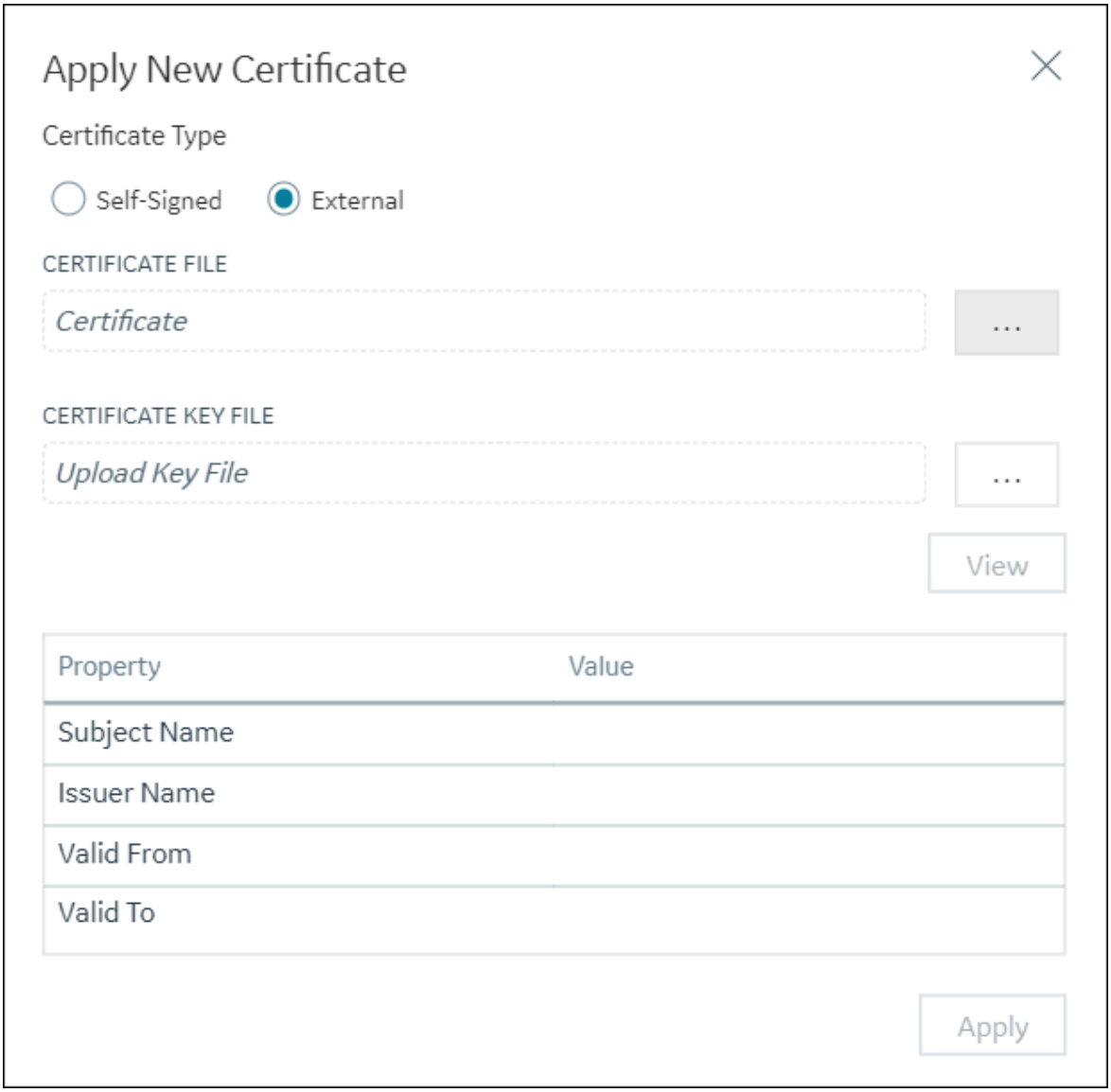
3. Select the Configuration Hub row.

   The DETAILS panel appears.

4. In the **CERTIFICATE DETIALS** section, select **Generate Certificate** button.

   The **Apply New Certificate** window appears.

5. Select **External** as a Certificate Type, as shown in the following figure.



> **Note:**
> For an External Certificate, the supporting certificates are in *.pfx* format or, *.crt* and *.key* for the pair.

6. For the CERTIFICATE FILE, select the button ... to upload the *.crt* file or *.pfx* file.

> **Note:**
> Only the *.key* or *.pfx* file format is supported here.

7. After uploading the certificate file and certificate key file, select **View**. The details such as Subject Name, Issuer Name, Valid From, and Valid To values will be displayed in the grid.
8. Select **Apply**.

   The *Certificates applied successfully* message appears.

Client Certificates for Configuration Hub

For a browser to have a secure connection to Configuration Hub, the Configuration Hub certificate must be copied to the remote machine and added to the trusted root folder. Client-side certificates validate the client's identity to the Configuration Hub web server.

Configuration Hub Root Certificate

To install the Configuration Hub root certificate:

1. Copy the ConfigHubRootCA.crt file on the server machine. By default, this file can be found in the C:\Program Files (x86)\Proficy\ConfigurationHub\ConfigHubPki folder.
2. Paste the ConfigHubRootCA.crt file to the destination computer.
3. Double-click ConfigHubRootCA.crt to install the certificate. The Install Certificate screen appears.
4. Click the Install Certificate button. The Import Certificate screen appears.
5. Select Local Machine, and then Next. A message appears requesting if you want to proceed.
6. Click Yes. The Certificate Store Screen appears.
7. Select Place All Certificates in the Following Store.
8. Click Browse, and then select Trusted Root Certificate Authorities and then click OK.
9. Click Next. The final screen appears.
10. Click Finish. A message should appear indicating the import was successful.

11. Click OK.
12. Restart the browser.

iFIX Client Certificates

To install the iFIX OPC UA Client root certificate:

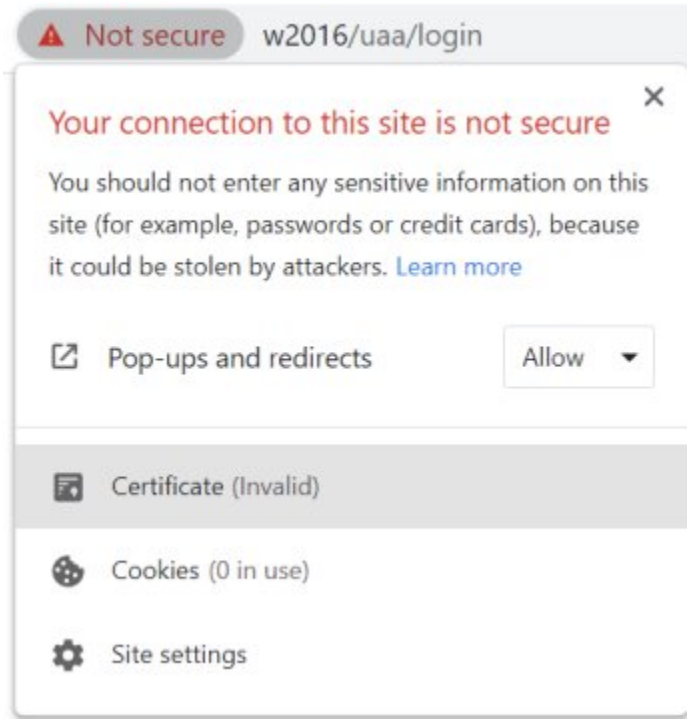
1. Copy the iFIX_OpcuaConfigRoot.crt file on the server machine. By default, this file can be found in the C:\Program Files (x86)\Proficy\iFIX\CFG\ iFIX_OpcuaConfigService folder.
2. Paste the iFIX_OpcuaConfigRoot.crt file to the destination computer.
3. Double-click iFIX_OpcuaConfigRoot.crt to install the certificate. The Install Certificate screen appears.
4. Click the Install Certificate button. The Import Certificate screen appears.
5. Select Local Machine, and then Next. A message appears requesting if you want to proceed.
6. Click Yes. The Certificate Store Screen appears.
7. Select Place All Certificates in the Following Store.
8. Click Browse, and then select Trusted Root Certificate Authorities and then click OK.
9. Click Next. The final screen appears.
10. Click Finish. A message should appear indicating the import was successful.
11. Click OK.
12. Restart the browser.

Enable a Trust for Historian with a Self-Signed Certificate

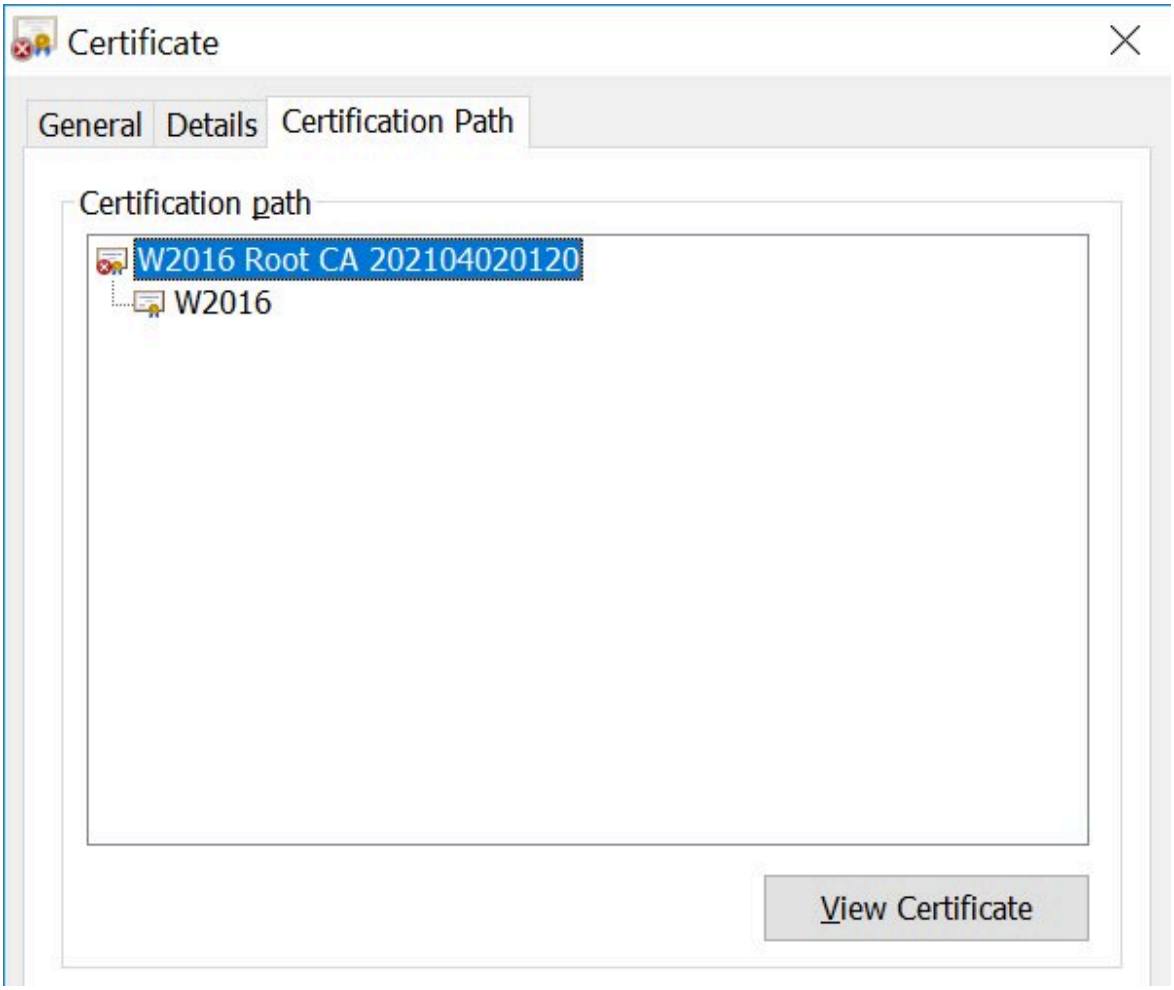
During Historian installation, a self-signed certificate is generated for use with Historian web applications. A self-signed certificate is a certificate that is signed by itself rather than signed by a trusted authority. Therefore, a warning appears in the browser when connecting to a server that uses a self-signed certificate until it is permanently stored in your certificate store. These steps describe how to ensure that Google Chrome trusts the self-signed certificate.

To enable a trust with Historian using a self-signed certificate in Chrome:

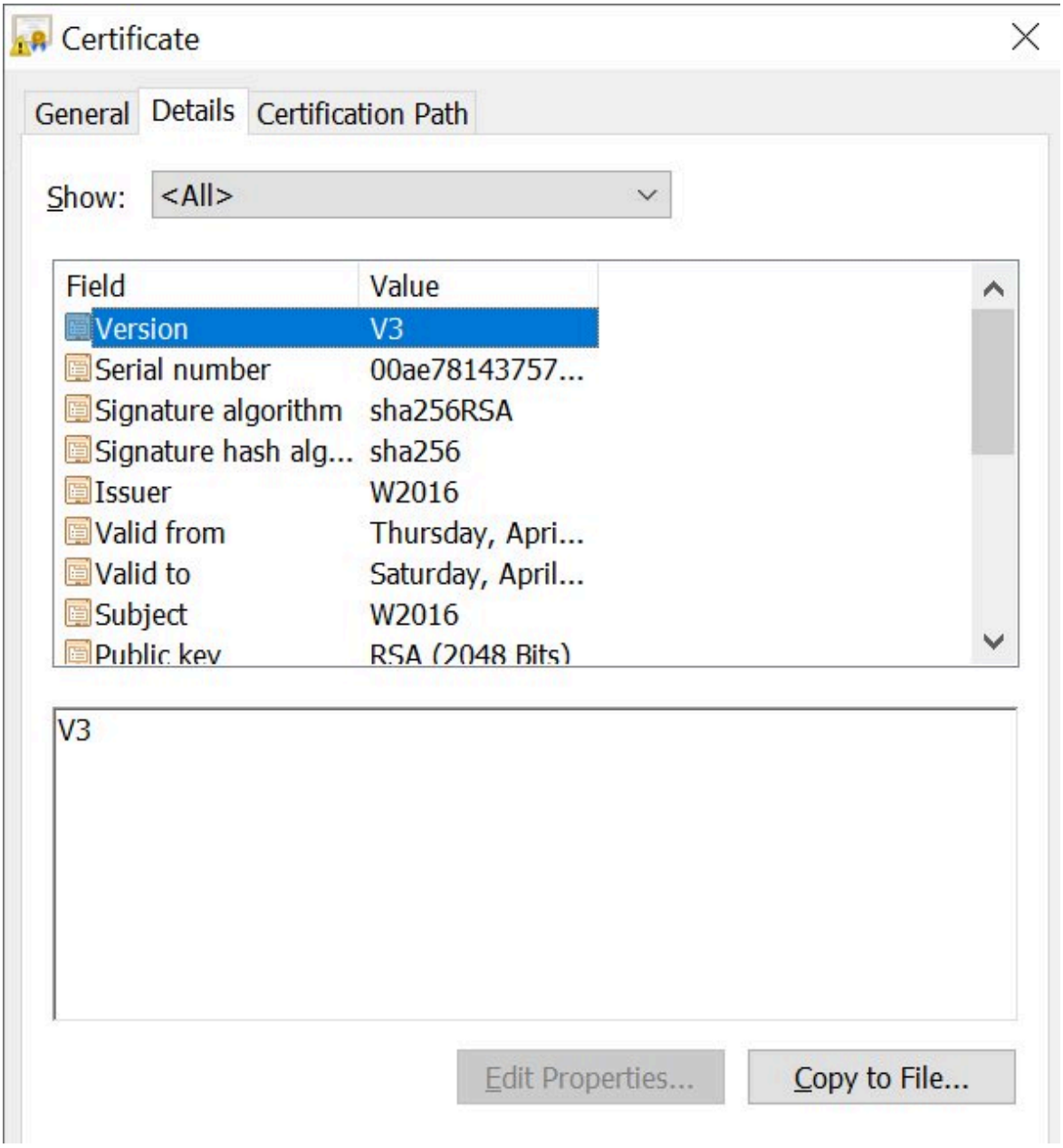
1. Using Google Chrome, access the site to which you want to connect. A message appears to inform you that the certificate is not trusted by the computer or browser.
2. Select **Not Secure** in the URL, and then select **Certificate**. The Certificate window appears.



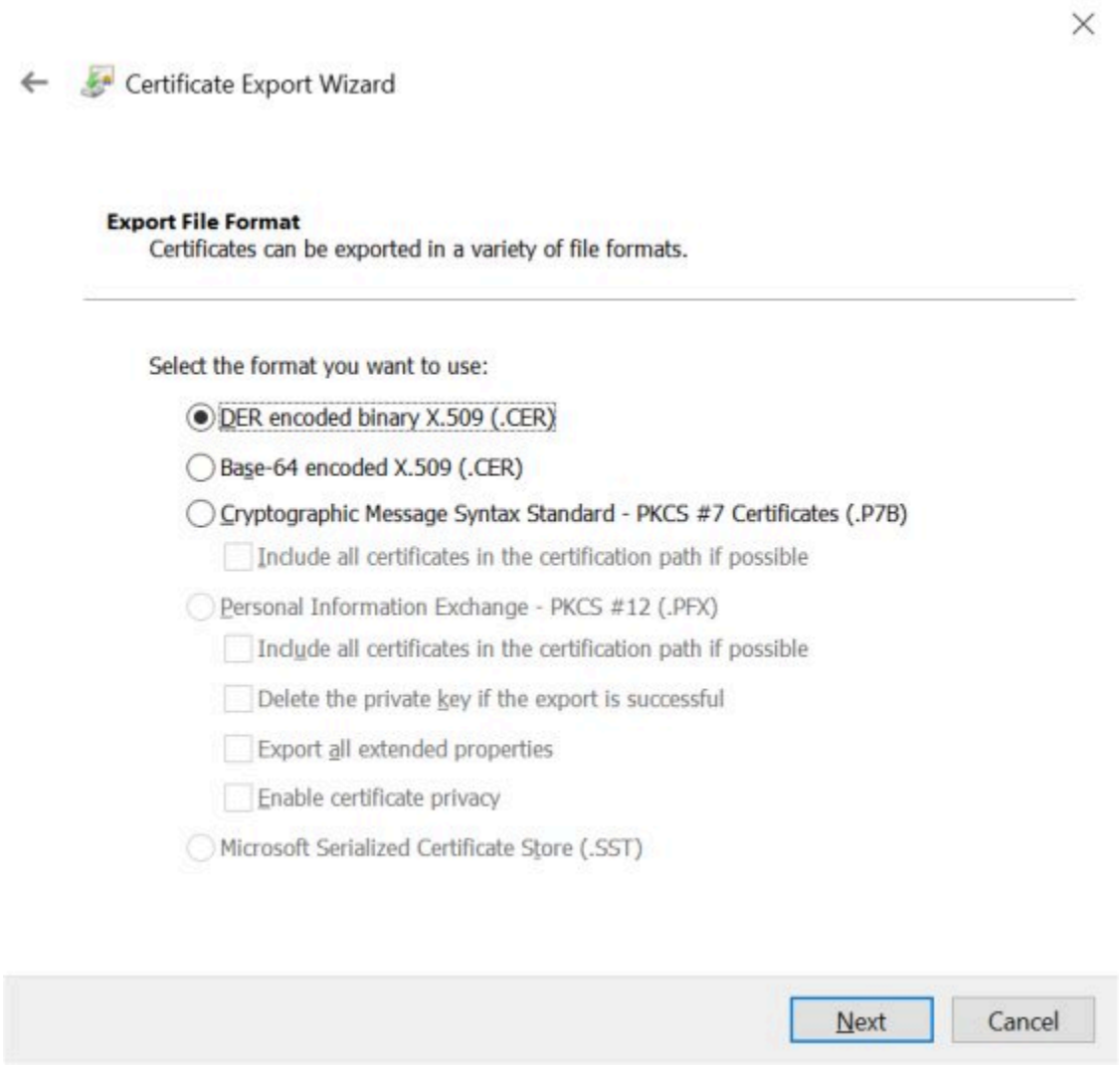
3. Select the **Certification Path** tab, and then select the **root certificate**.



4. Select **View Certificate**. The Certificate window appears, displaying the General, Details, and Certification Path sections.
5. Select the **Details** tab, and then click **Copy to Files**.

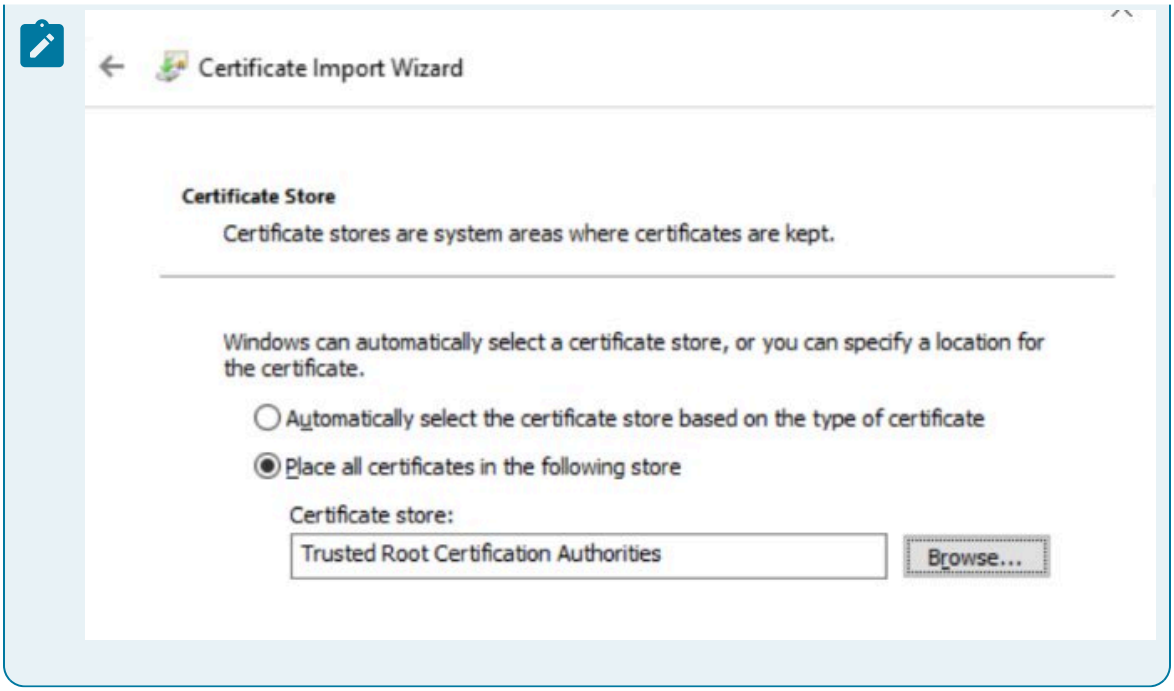


6. Follow the on-screen instructions to save the certificate to a local file. Use the default format: DER encoded binary X.509 (.CER).



7. Right-click the .CER file that you have exported, and select **Install Certificate**. The Certificate Import Wizard window appears.
8. Select **Local Machine** and click Next.
9. Select **Trusted Root Certificate Authorities**, and then select OK.

> **Note:**
> Do not let the wizard select the store for you.



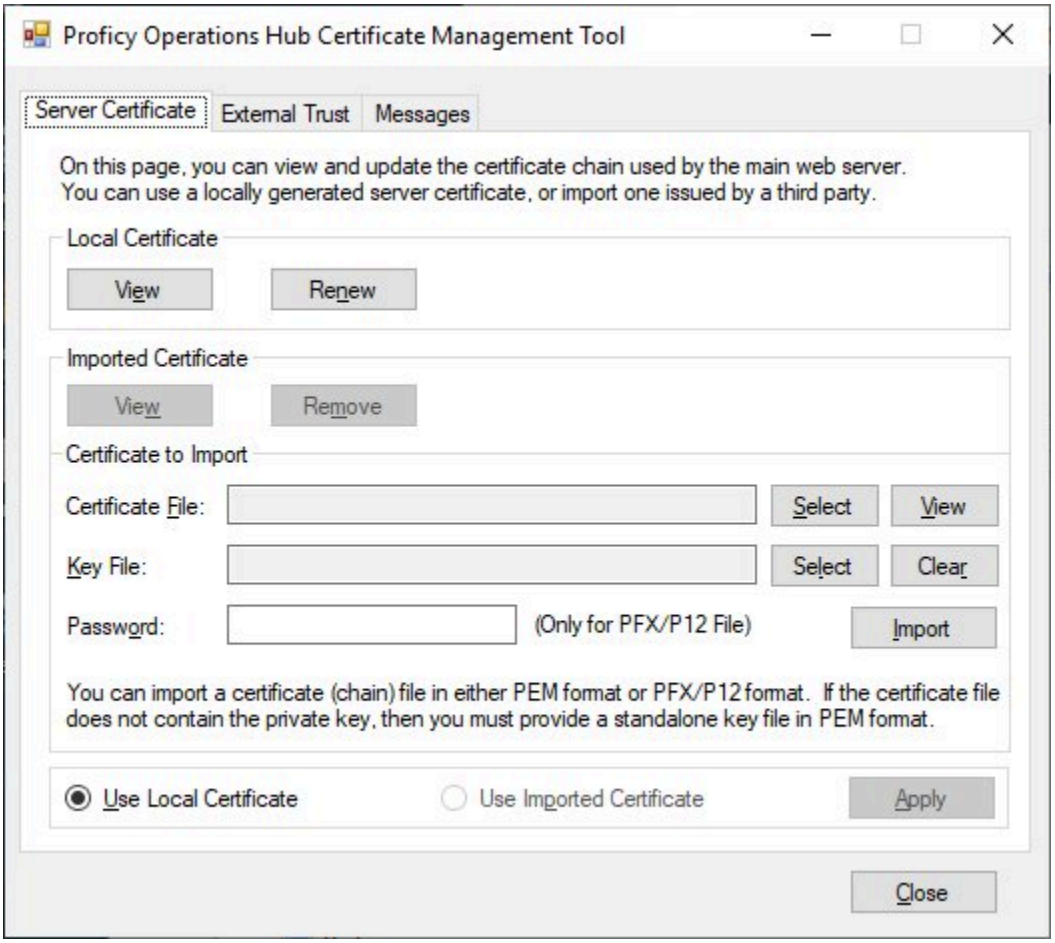
A Security Warning window may appear. If it does, ignore the message by selecting Yes. The certificate is installed.

10. Restart the browser, and connect to the server.
11. Open the URL authenticated by the certificate. If error messages do not appear, the certificate is successfully imported.

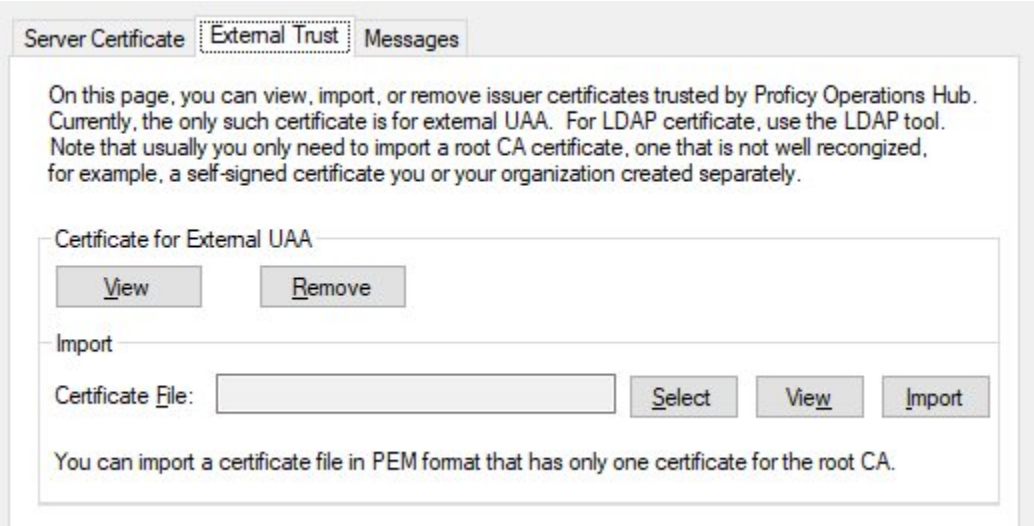
Import an Issuer Certificate in Chrome for Historian

If you want to use Historian with Configuration Hub and Proficy Authentication, you must import an issuer certificate.

1. Copy the issuer certificate from the machine on which Proficy Authentication is installed.
2. Access the **Certificate Management** tool. The Operations Hub Certificate Management Tool page appears, displaying the Server Certificate section.



3. Click the **External Trust** tab.
4. Next to the Certificate File box, click **Select**.



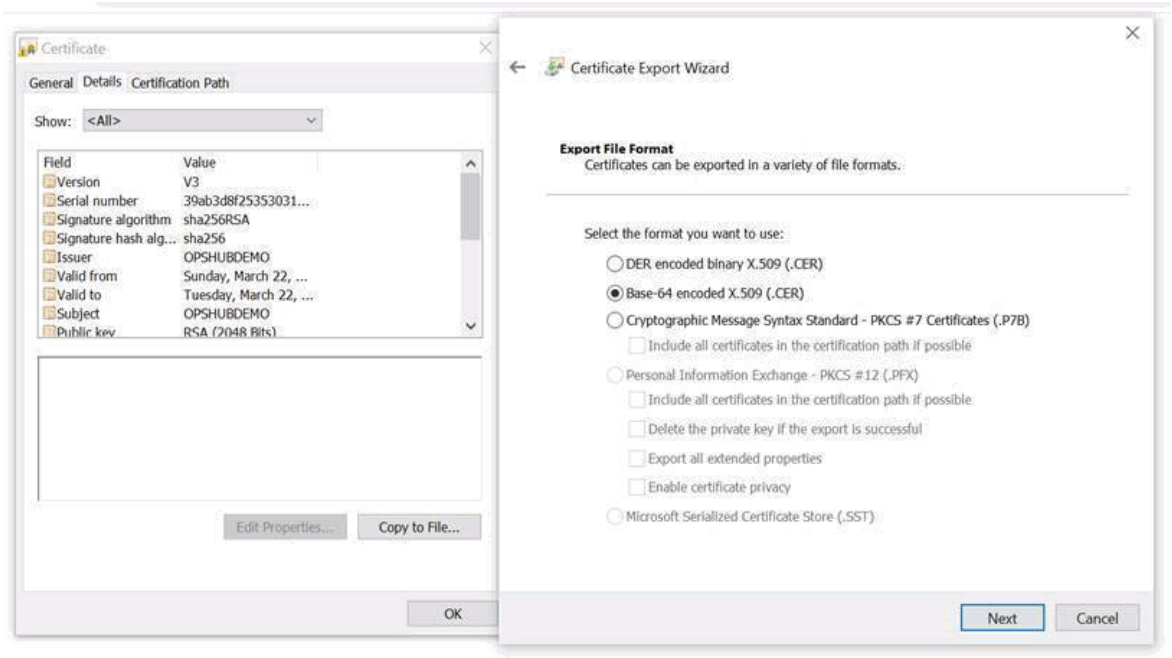
The Open dialog box appears.

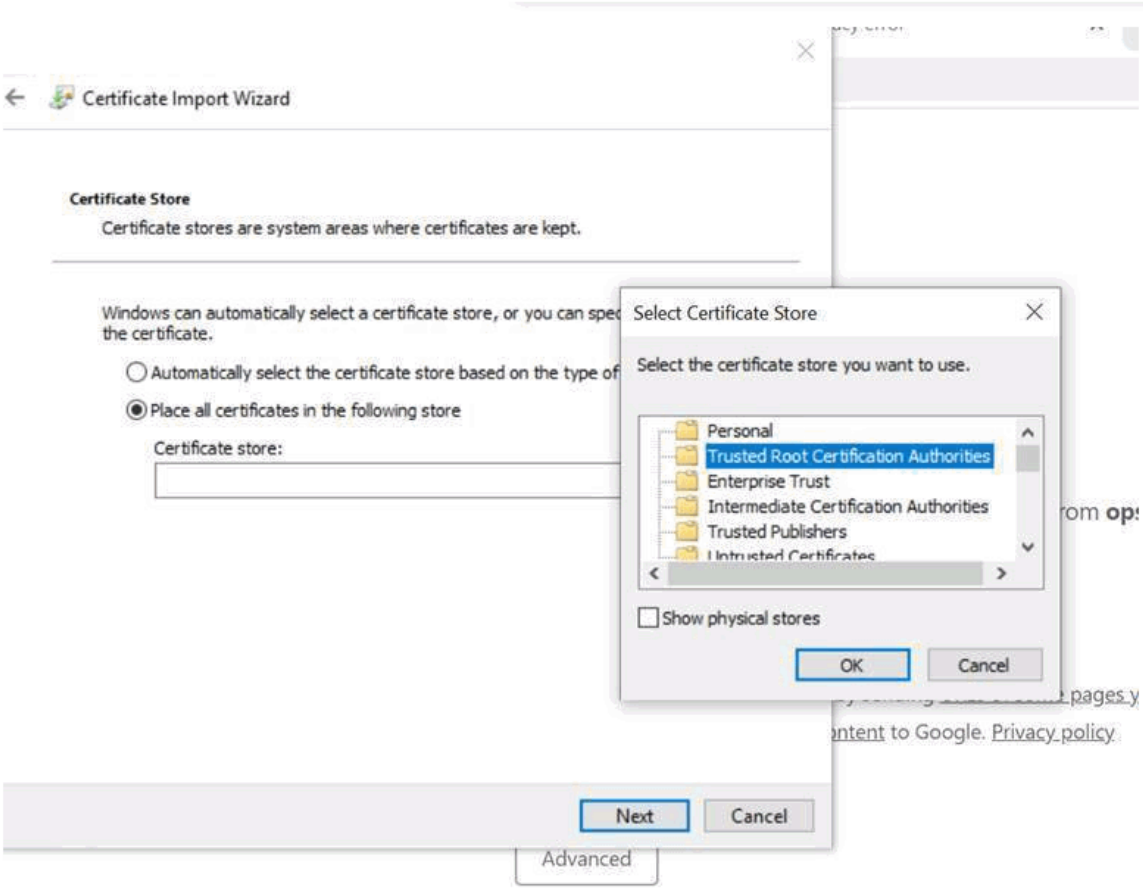
5. Navigate to and select the certificate file, and then click **Open**. Another screen appears.
6. Click **Import**. A message appears asking you to confirm that you want to import a certificate.
7. Select **Yes**. You are now ready to use Configuration Hub.

For more information on Historian, security, and certificates, refer to the Historian online documentation.

Operations Hub Client Certificates

1. On the client machine, open a browser such as Google Chrome and access the Operations Hub server using the url. For example: `https://opshubservername/iqp.` The browser should display a "Not secure" icon.
2. Right-click the Not Secure icon, which should lead you to a Certificate dialog box.
3. Find the issuer in the **Certificate Path** tab.
4. On the issuer, select **View Certificate**.
5. In the **Certificate** dialog box, on the issuer certificate, select the **Details** tab and then **Copy To File**.
6. Right-click that exported certificate file, and choose to import it into the Trusted Root Certificate Authorities store.


Certificate
General
Details
Certification Path
Show:
<All>
Field
Value
Version
V3
Serial number
39ab3d8f25353031...
Signature algorithm
sha256RSA
Signature hash alg...
sha256
Issuer
OPSHUBDEMO
Valid from
Sunday, March 22, ...
Valid to
Tuesday, March 22, ...
Subject
OPSHUBDEMO
Public key
RSA (2048 Bits)
Edit Properties...
Copy to File...
OK
Certificate Export Wizard
Export File Format
Certificates can be exported in a variety of file formats.
Select the format you want to use:
DER encoded binary X.509 (.CER)
Base-64 encoded X.509 (.CER)
Cryptographic Message Syntax Standard - PKCS #7 Certificates (.P7B)
Include all certificates in the certification path if possible
Personal Information Exchange - PKCS #12 (.PFX)
Include all certificates in the certification path if possible
Delete the private key if the export is successful
Export all extended properties
Enable certificate privacy
Microsoft Serialized Certificate Store (.SST)
Next
Cancel


Certificate Import Wizard
Certificate Store
Certificate stores are system areas where certificates are kept.
Windows can automatically select a certificate store, or you can spec
the certificate.
Automatically select the certificate store based on the type of
Place all certificates in the following store
Certificate store:
Next
Cancel
Select Certificate Store
Select the certificate store you want to use.
Personal
Trusted Root Certification Authorities
Enterprise Trust
Intermediate Certification Authorities
Trusted Publishers
Untrusted Certificates
Show physical stores
OK
Cancel
Advanced
rom ops
pages y
ntent to Google. Privacy policy

Proficy Authentication Certificate

The location of the Proficy Authentication certificate is, by default:

```
C:\Program Files (x86)\Proficy\ConfigurationHub\UaaCert\uaa_cert.crt
```

During iFIX registration with Proficy Authentication, this certificate is automatically imported for you. However, if there is error or you want to reinstall the certificate, you can browse to the folder above on the installed product folder, and then copy it and register it manually.

Proficy Authentication Certificate

To install the Proficy Authentication certificate:

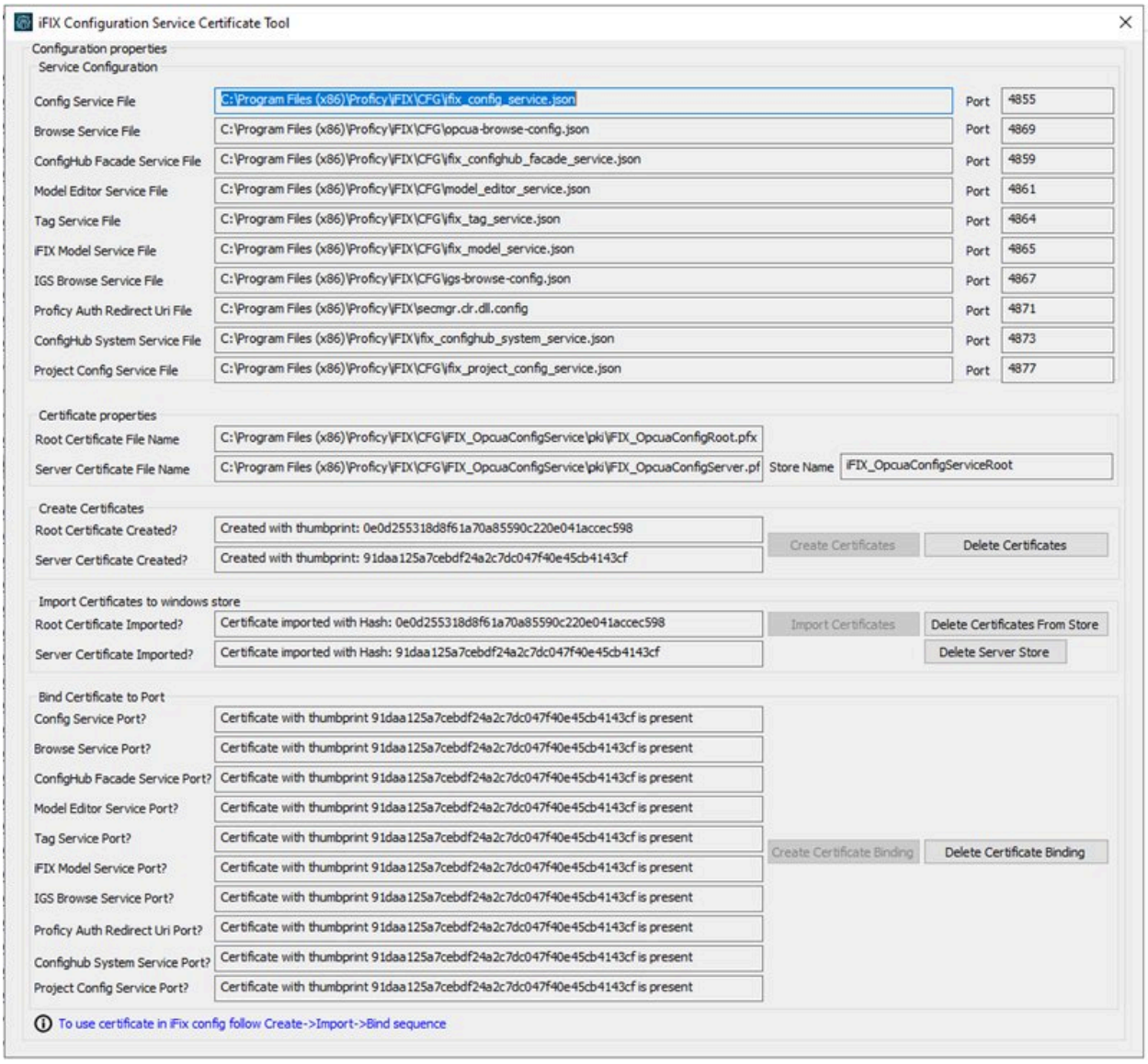
1. Copy the uaa_cert.crt file from the C:\Program Files (x86)\Proficy\ConfigurationHub\UaaCert folder.
2. Paste the uaa_cert.crt file to the destination computer.
3. Double-click uaa_cert.crt to install the certificate. The Install Certificate screen appears.
4. Click the Install Certificate button. The Import Certificate screen appears.
5. Select Local Machine, and then Next. A message appears requesting if you want to proceed.
6. Click Yes. The Certificate Store Screen appears.
7. Select Place All Certificates in the Following Store.
8. Click Browse, and then select Trusted Root Certificate Authorities and then click OK.
9. Click Next. The final screen appears.
10. Click Finish. A message should appear indicating the import was successful.
11. Click OK.
12. Restart the browser.

iFIX Certificates

If there is an error with an iFIX certificate or you need to perform an update of the certificate, use the following steps to refresh your certificate. Steps for self-signed certificates and external certificates are outlined in the following sections.

Self-Signed Certificates for iFIX

The iFIX Configuration Service Certificate Tool (iFixConfigServiceCertTool.exe) can be used to create new self-signed certificates for iFIX.



Use the following steps to update your self-signed certificates for your iFIX instance:

1. As an Administrator, open the **iFixConfigServiceCertTool.exe** tool. This tool is found in the C:\Program Files (x86)\Proficy\iFIX\ folder. The iFIX Configuration Service Certificate Tool appears.
2. Click **Delete Certificates**, and then click **Delete Certificate Binding**.
3. From the Windows File Explorer, remove or backup the certificate files in C:\Program Files (x86)\Proficy\iFIX\CFG\iFIX_OpcuaConfigService\pki directory.
4. From iFIX Configuration Service Certificate Tool, create the new certificates by clicking on the **Create Certificates** button.

5. After the new set of certificates are created, ensure that the certificate thumbprint is different in the iFIX Configuration Service Certificate Tool. If they are not different, the new certificates are not created.
6. Copy the iFIX_OpcuaConfigServer.crt and iFIX_OpcuaConfigServer.key files from C:\Program Files (x86)\Proficy\iFIX\CFG\iFIX_OpcuaConfigService\pki into the C:\Program Files (x86)\Proficy\iFIX \web\conf directory.
7. Restart the computer.

External Certificates for Configuration Hub and iFIX

Use the following steps to configure an externally issued server certificate for Configuration Hub and iFIX.

1. Obtain the private key, server certificate, and the CA bundle that contains the certificates for the issuers. Typically, the private key is generated by you or someone in your organization, and the certificate vendor provides you with the server certificate and the CA bundle.
2. If you received the certificates and the private key in other formats (such as PFX), consult your vendor on how to obtain them as or convert them into PEM files.
3. In a text editor, open the PEM file and locate the multiple certificates mentions; each certificate is enclosed by an opening line:

   ```
   -----BEGIN CERTIFICATE-----
   ```

   and a closing line:

   ```
   -----END CERTIFICATE-----
   ```

4. Confirm that the server certificate appears first in this certificate PEM file, followed by the CA certificates in the CA bundle.
5. For Configuration Hub, copy the root and server certificates and key files into the C:\Program Files (x86)\Proficy\ConfigurationHub\ConfigHubPki folder, and the server certificate and key files to the C:\Program Files (x86)\Proficy\ConfigurationHub\Web\httpd\conf folder. (In Configuration Hub the HTTPD server certificate files are named: server.crt and server.key.)

   Note:
   If there is a name change, then the httpd.conf file in the C:\Program Files (x86)\Proficy \ConfigurationHub\Web\httpd\conf\httpd.conf folder also must be updated with the correct file names.

6. If iFIX is used with Configuration Hub, copy the root and server certificates and key files into the C:\Program Files (x86)\Proficy\iFIX\CFG\iFX_OpcuaConfigService\pki folder, and

the server certificate and key files to the C:\Program Files (x86)\Proficy\iFIX\web\conf folder. (In iFIX, the HTTPD server certificate files are named: iFIX_OpcuaConfigServer.crt and iFIX_OpcuaConfigServer.key.)

> **Note:**
> If there is a name change, then the httpd.conf file in the C:\Program Files (x86)\Proficy \ConfigurationHub\Web\httpd\conf\httpd.conf folder also must be updated with the correct certificate file names.

7. Also for iFIX, edit the ifix_config_service.json file (found in the C:\Program Files (x86)\Proficy\iFIX \CFG folder) with the correct certificate file names. The following fields must be updated in this file:

```
"rootCertificateName": "iFIX_OpcuaConfigRoot",
"serverCertificateName": "iFIX_OpcuaConfigServer",
"serverCertificatePassPhrase": "75D43CAAC1E440F08080D7E4A58AE941",
"generateSSLCerts": false
```

> **Important:**
> The "generateSSLCerts" field must be set to false if external certificates are used.

Product Registration

Product Registration Overview

The Central Registration and Install Time Registration features improve product registration with Configuration Hub. Configuration Hub facilitates the registration of product plug-ins and centralizes the management of these plug-ins. These registration options ensure a seamless and harmonized user experience across the installation and registration processes for various products.

There are two methods available to register your product plug-ins:

- **Install Time Registration**: Allows the product to be registered with Configuration Hub during product installation. This method requires Configuration Hub and Proficy Authentication details before installing the product.

  Note:
  If you choose this method, ensure that the Configuration Hub and Proficy Authentication server details are available before the product installation. For more details, see Install Time Registration *(on page 87)*.

- **Central Registration**: Allows you to centrally register the product plug-in with Configuration Hub from within Configuration Hub after product installation. It does not require the prior installation of Configuration Hub and Proficy Authentication before product installation.

  Note:
  If you choose this method, configure the Node Manager utility by providing the Proficy Authentication server details to update the product with Proficy Authentication. For more details, see Central Registration *(on page 91)*.

Note:

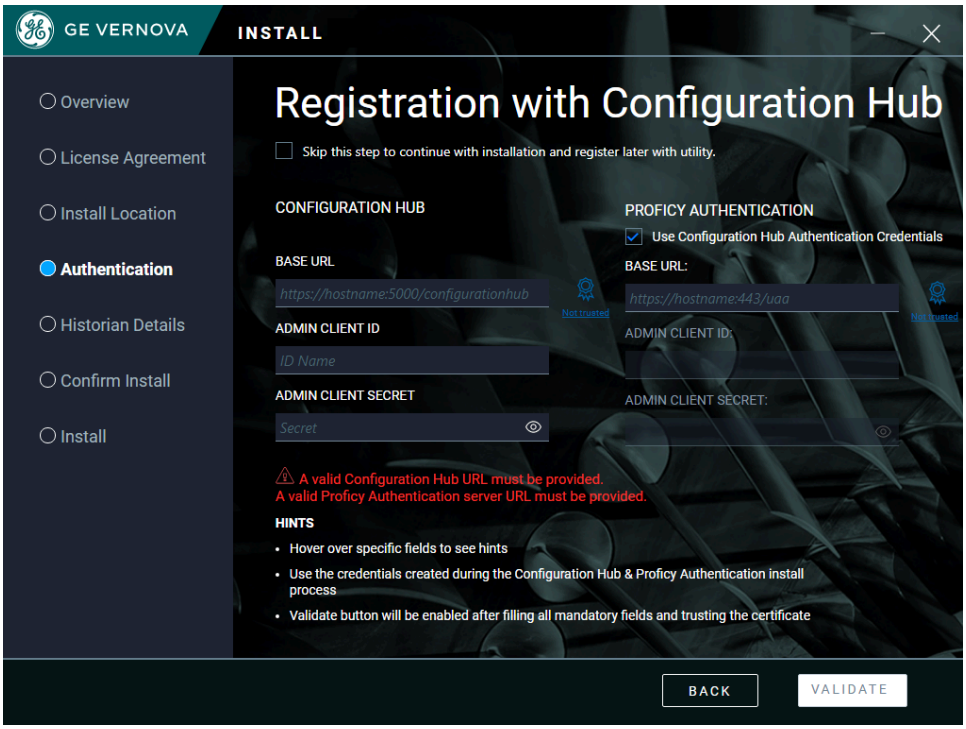
- You can centrally unregister the product within Configuration Hub, regardless of which registration method you used to register the plug-in.
- To make use of the Central Registration and Install Time Registration enhancements implemented in version 2024, you must upgrade Configuration Hub and Proficy Authentication to version 2024 or higher.

Install Time Registration

During the installation process, you will be prompted to provide the Configuration Hub and Proficy Authentication server details for product registration with Configuration Hub and for updating the product with Proficy Authentication. After successful installation, the product will automatically register with Configuration Hub and appear as a plug-in within Configuration Hub.

- Ensure that Configuration Hub and Proficy Authentication are at version 2024 or higher, as applicable. You can install the Common components, which include Configuration Hub and Proficy Authentication, directly from the welcome screen of the `<proficy_product>` installer.
- The time on the Configuration Hub server and the product node should be synchronized, meaning there should not be any delay of more than five minutes during remote operations.

The following steps are to be performed during your product installation when you reach the **Registration with Configuration Hub** section of the procedure.



1. On the **Registration with Configuration Hub** screen, enter the Configuration Hub server details as follows:

Field	Description
BASE URL	Enter a valid base URL in the following format `https://hostname:<port number>/configurationhub`

Field	Description
	◦ hostname: The name of the Configuration Hub server to which you want to register. In the <Fully Qualified Domain Name> format. ◦ <port number>: The port number of the Configuration Hub server to which you want to register. **Note:** ◦ Do not enter a slash at the end of the base URL. ◦ If the base URL indicates **Not trusted**, it means there is no trust established with the host, or the root certificate of Configuration Hub server is incorrect. You must verify the base URL and enter a valid URL to establish the trust with the host and with the correct root certificate details.
ADMIN CLIENT ID	The admin client ID of the Configuration Hub server that you provided during the Configuration Hub installation.
ADMIN CLIENT SECRET	The admin client secret of the Configuration Hub server that you provided during the Configuration Hub installation.

2. Enter the Proficy Authentication server details as follows:

Field	Description
Use Configuration Hub Authentication Credentials	Click this check box if you entered the same credentials (Admin Client ID and Admin Client

Field	Description
	Secret) for both Configuration Hub and Proficy Authentication during installation.
BASE URL	Enter a valid base URL in the following format `https://hostname:<port number>/uaa` ◦ hostname: The name of the Configuration Hub server to which you want to register. In the <Fully Qualified Domain Name> format. ◦ <port number>: The port number of the Proficy Authentication server to which you want to register. **Note:** ◦ Do not enter a slash at the end of the base URL. ◦ If the base URL indicates  **Not trusted**, it means there is no trust established with the host, or the root certificate of Proficy Authentication server is incorrect. You must verify the base URL and enter a valid URL to establish the trust  with the host and with the correct root certificate details.
ADMIN CLIENT ID	The admin client ID of the Proficy Authentication server.
ADMIN CLIENT SECRET	The admin client secret of the Proficy Authentication server.

3. Click **VALIDATE**.

Note:

- The validate button will be enabled only if you enter all the mandatory fields and trust the root certificate.
- If the entered details are incorrect, the validation fails, and the Validate button will not be enabled. You cannot proceed further with the installation of the product until you enter the correct details in the fields.

4. Click **START** in the **Confirm Install** screen to continue the product installation.

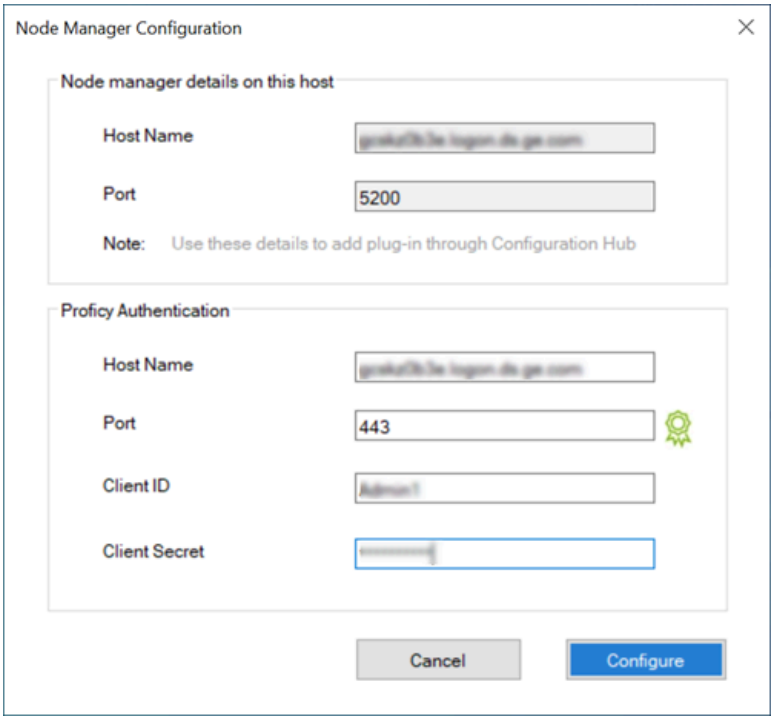
After you reboot your machine to complete your product installation and log into Configuration Hub, the product plug-in will appear in the Navigation pane, ready for use.

Central Registration

If you did not register your Proficy product with Configuration Hub during product installation, you must take additional steps (after you have installed both Configuration Hub and Proficy Authentication) to register your Proficy product (such as iFIX, CIMPLICITY, Operations Hub, or Historian) with Configuration Hub.

- During product installation, you have the option to skip providing the Configuration Hub and Proficy Authentication server details. After successful installation, use the Node Manager Configuration Utility installed on the desktop to configure the Node Manager and update the product(s) with Proficy Authentication.
- If you want to use a Configuration Hub server on a computer that is not on the local machine, you will need to register with the Configuration Hub server on the remote computer.
- If you configured Configuration Hub with your Proficy product and now you want to change to a remote Configuration Hub server, you will need to unregister Configuration Hub on the local machine first, and then register with the remote Configuration Hub server.
- Any time that you install Proficy software without registering that software with Configuration Hub during install, you will need to run the Node Manager utility on the desktop before you can see that software show up centrally in the Configuration Hub > Administration > Node Manager panel.

1. Use the desktop icon to run the **Node Manager Configuration Utility** with administrator privileges.
   The **Node Manager Configuration** window appears.



2. Configure the Node Manager as follows:
    - **Proficy Authentication**
        - **Host Name:** The name of the Proficy Authentication server to which you want to update the product(s) with Proficy Authentication, in the <Fully Qualified Domain Name> format.
        - **Port:** The port number of the Proficy Authentication server.
        - **Client Id:** The client ID of the Proficy Authentication server, provided during the Proficy Authentication installation.
        - **Client Secret:** The client secret of the Proficy Authentication server, provided during the Proficy Authentication installation.

> **Note:**
> If the root certificate of the Proficy Authentication server is not trusted, click not trusted ; the **Certificate Details** page appears. Click **Trust** to trust the root certificate.
>
> The root certificate is trusted .

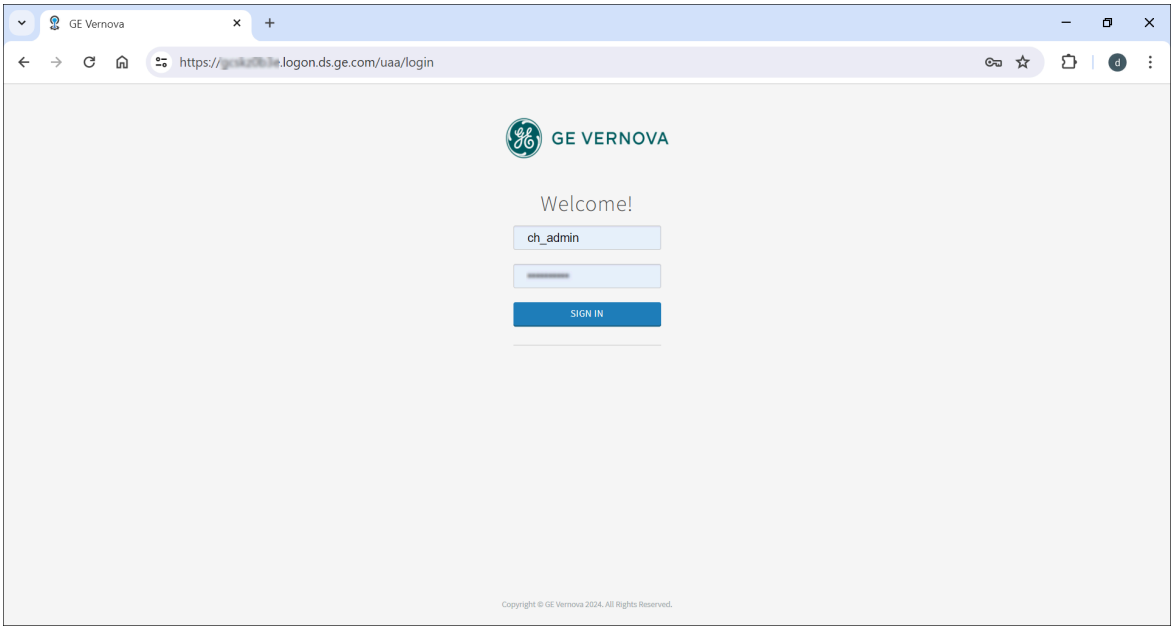
- **Node manager details on this host**
  - **Host Name:** The name of the node server where the product is installed, in the <Fully Qualified Domain Name> format. This field is automatically populated and disabled.
  - **Port:** The node manager port number where the product is installed. The port number field is disabled.

> **Note:**
> Ensure that you enter the same host details to integrate the product plug-in(s) in Node Manager within Configuration Hub and proceed with the registration of the product(s) on the node in Configuration Hub.

3. Click **Configure**.
   The following message appears.

   Successfully updated Proficy authentication for Products <product(s) installed>.

4. Double-click the **Configuration Hub** desktop shortcut.

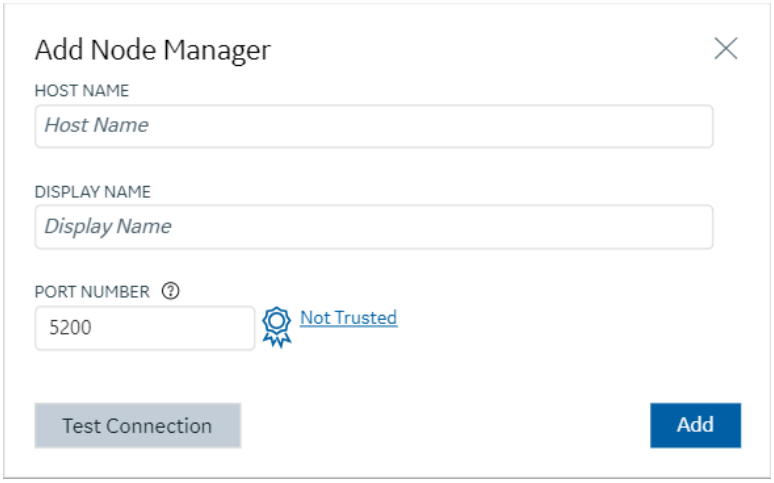


5. Enter the following credentials, and then click **SIGN IN**.
   - User Identifier: The default user id for first time users; that is, **ch_admin**.
   - Password: The password you entered in the **Client Secret** field in the Proficy Authentication section of the Node Manager Configuration window.

   The Configuration Hub user interface appears.

> **Note:**
> After you log in to Configuration Hub, in Proficy Authentication, include the groups as required. Only an administrator with admin rights in **Security-Proficy Authentication** can provide user permissions to the groups. Refer to the **Proficy Authentication** documentation for more information on granting permissions to Groups and Users.

6. In the NAVIGATION panel, click > **Administration**.
   The Node Manager and License Server panels will appear.
7. Click **Node Manager**.
   The **Node Manager-Administration** panel appears displaying the Configuration Hub and Proficy Authentication product details.
8. Click + to add the Node Manager.



   The **Add Node Manager** window appears. Enter the following details:
   - **HOST NAME**: The name of the node server where the product is installed. In the <Fully Qualified Domain Name> format.
   - **DISPLAY NAME**: The display name is automatically populated, reflecting the host name field. You can choose to edit the display name as needed.
   - **PORT NUMBER**: The node manager port number where the product is installed.

> **Note:**
> The **HOST NAME** and **PORT NUMBER** details, as populated in the Node Manager Configuration window under the **Node Manager details on this host** section, must match the same details. Refer to Step 13 *(on page 91)*.

Note:

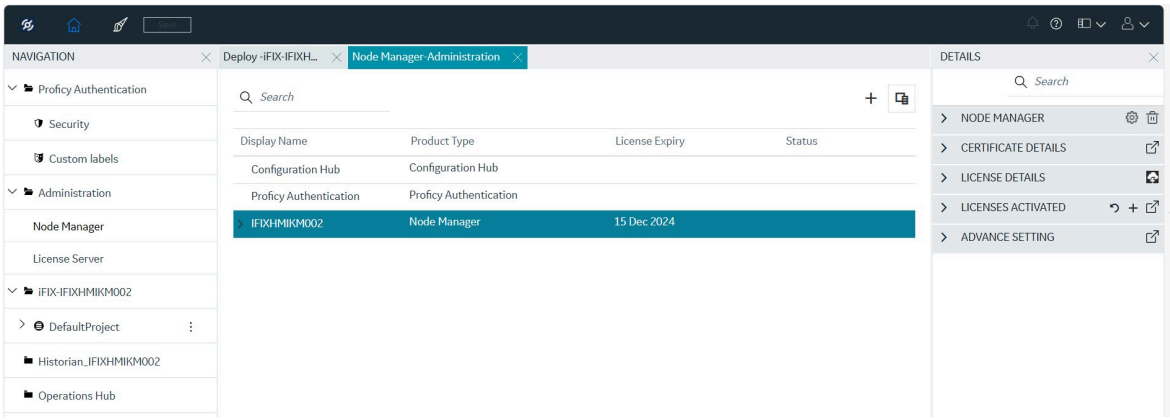
If the root certificate of the Node Manager is not trusted, then click not trusted , the **Certificate Details** page appears. Click **Trust** to trust the root certificate.

The root certificate is trusted .

9. Click **Add**.

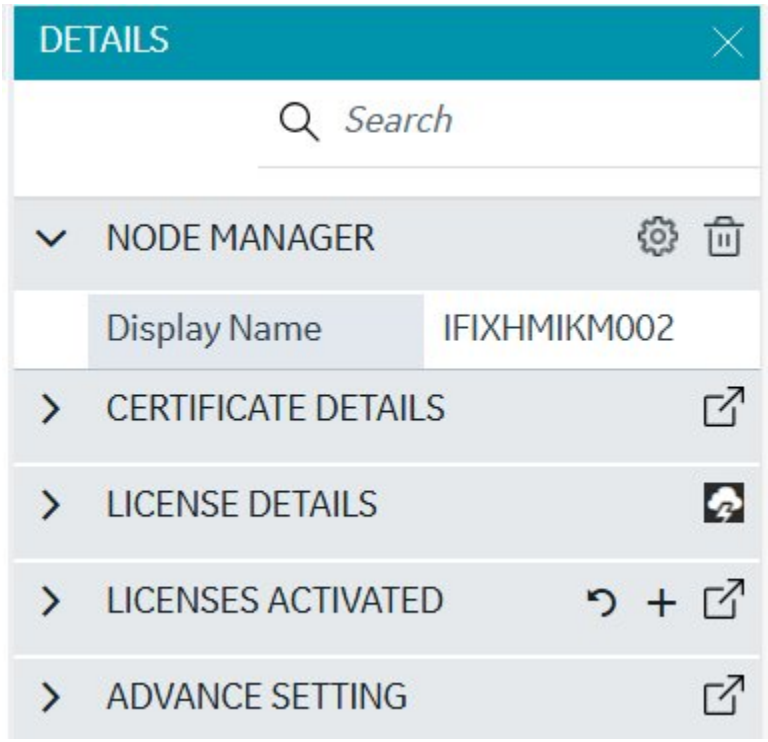
   The *Node Manager added successfully* message appears.

10. In the grid-view, select the Node Manager row and confirm that the information in the DETAILS panel for that selected node is correct.



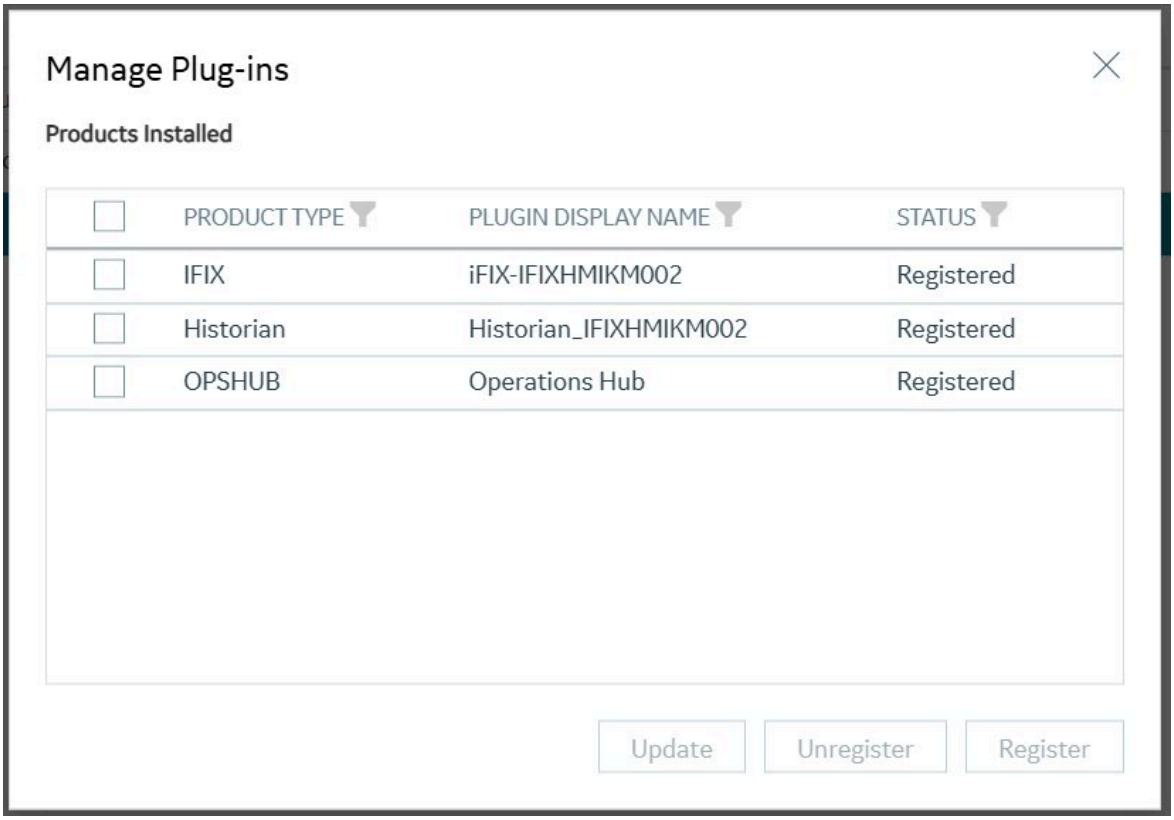
Within the DETAILS panel, you can perform the following actions in the Node Manager section:

- View or modify the node name. Click > next to the **NODE MANAGER**to modify the Display Name field.



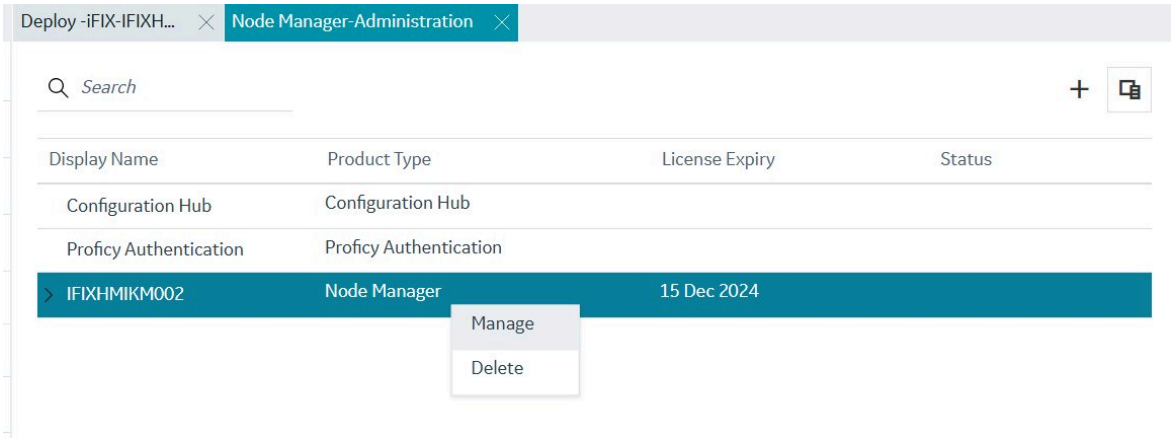
Note:
You can modify the Node Manager display name only after adding the Node Manager.

- View or manage plug-ins. Click the **Manage** button next to the **NODE MANAGER** text in the DETAILS panel to open the **Manage Plug-ins** dialog box. The installed products should all appear in this dialog box.

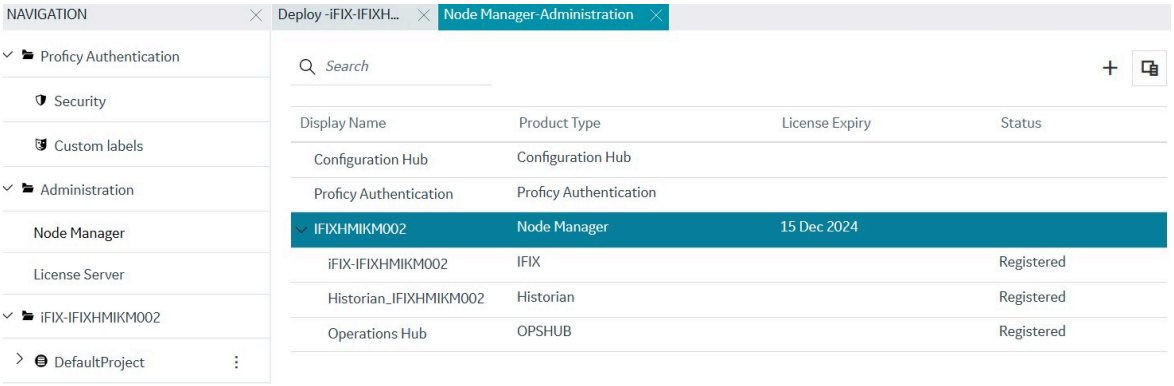


If you want to register or unregister a product with Configuration Hub, select the check box next to the product name, and then either select **Register** or **Unregister**. You can modify the plug-in display name from this dialog box as well. The NAVIGATION panel should update with your changes.

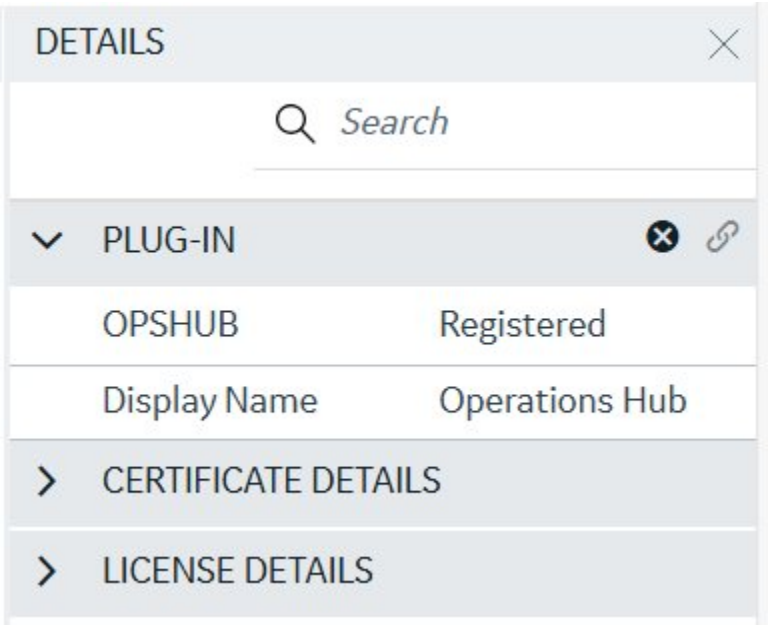
Note:
You can also right-click on the Node Manager row in the grid and select **Manage** or **Delete** as needed to perform actions similar to those in the Node Manager section within the DETAILS panel. See the following figure for an example of the drop-down from the grid view.



11. In the Node Manager, in grid view, click > next to the node name to view and confirm the list of installed products installed on that node. In the following example, the selected node has iFIX, Historian, and Operations Hub installed.



12. Select a product, and in the Details pane click the > next to the **PLUG-IN** heading. The following figure shows the information you can edit from the DETAILS panel for a product.



On the DETAILS panel for the Plug-in, you can:

- Modify the Display Name field.

  Note:
  You can modify the product plug-in display name only after registering the product.

- Register a product. Click the **Register** button.

  The **Register Plug-in** dialog box appears. The PLUGIN HOST, PRODUCT TYPE, and DISPLAY NAME fields are auto populated. Click **Register** to register the product with Configuration Hub.

  The *Plugin(s) Registered Successfully* message appears, and the product plug-in is now listed in the NAVIGATION panel.

- Unregister a product. Click the **Unregister** button.

  The **Unregister Plug-in** dialog box appears. If you click **Continue** to unregister the product, the product plug-in will be removed from the NAVIGATION panel. Also, any open panel belonging to this plug-in will be closed, and changes to the product plug-in will not be saved.

> **Note:**
> You can also right-click on the product row and select **Register** or **Unregister** as needed to perform actions similar to those in the PLUG-IN section within the DETAILS panel.
>
> If you click **Register**, the *Plugin(s) Registered Successfully* message appears, and the product plug-in is now listed in the NAVIGATION panel.

Upgrade/Migration Considerations

Upgrade

- From pre-2024 versions: If the common components have already been installed and upgraded to the latest version, the old/existing product plug-in will be unregistered and replaced by the new plug-in during the install process.
- From version 2024: If the common components have already been installed and upgraded, the old/existing product plug-in will be retained.
- If you skip plug-in registration during install, or upgrade/install the common components after installing/upgrading your product, follow the steps in Central Registration *(on page 91)*.

Migration of Common Components (v2024 or later) Post-Registration

If a new Proficy Authentication Server has been installed on the same network:

1. Unregister the product plug-in. See step 11 in Install Time Registration *(on page 91)*.
2. Unregister Configuration Hub with the old Proficy Authentication server and register with the new Proficy Authentication server.
3. Follow the steps in Central Registration *(on page 91)* to provide the credentials for the new Proficy Authentication server.
4. Register the product using the Administration panel in Configuration Hub.

If a new Configuration Hub server has been installed on the same network:

1. Unregister the product plug-in from the old Configuration Hub server. See step 11 in Install Time Registration *(on page 91)*.
2. Register the new Configuration Hub server with the existing Proficy Authentication server.
3. Register the product using the Administration panel in Configuration Hub.

If both a new Configuration Hub server and Proficy Authentication server have been installed on the same network:

1. Unregister the product plug-in from the old Configuration Hub server. See step 11 in Install Time Registration *(on page 91)*.
2. Register the new Configuration Hub server with the existing Proficy Authentication server.
3. Follow the steps in Central Registration *(on page 91)* to provide the credentials for the new Proficy Authentication server.
4. Register the product using the new Configuration Hub's Administrator plug-in.

Central License Management

Central License Management

You can now centrally manage Proficy product from Configuration Hub. You can perform actions related to product license management such as viewing licenses, activating licenses, and returning licenses, and also manage product license expiration from the Node Manager in the Administration panel. And from the License Server-Administration panel, you can perform actions such as adding a new Local License Server, adding activation codes of the Proficy product(s) to the Local License Server, removing activation codes, reserving licenses, cleaning licenses, generate offline activation requests, generate response file, update licenses from response file, and other actions.

The following panels in Configuration Hub help you to perform the actions centrally to manage the Proficy product licenses:

- License Server-Administration *(on page 101)*
- Node Manager - Administration *(on page 48)*

License Server-Administration

The License Server within the Administration panel facilitates easy integration of the product licenses into License Server. The License Server-Administration panel helps you to add the Proficy product activation codes from the Local License Server or, directly add the activations codes from Cloud server.

From the License Server-Administration panel, you can perform the following actions, including but not limited to:

- Adding a server
- Adding activation codes
- Removing activation codes

- Reserving licenses
- Cleaning licenses
- Generating offline activation requests
- Generating response files
- Updating licenses from response files

Adding a Local License Server

In the License Server-Administration panel, you have the option to add the Local License Server to store Proficy product activation codes. Later, you can activate the product licenses using the Activate License *(on page 58)* + button in the node manager details section of the Node Manager-Administration panel.

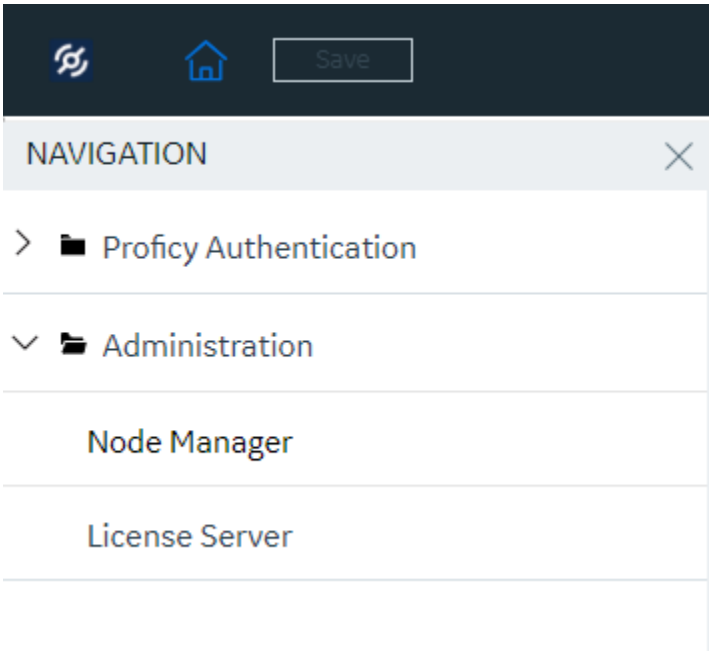
Before you begin

Ensure that you have the Local License Server or Cloud Server connection established with the License Server in Configuration Hub.

Procedure

1. Log into Configuration Hub with Proficy Authentication credentials.

   The NAVIGATION panel appears.



2. In the NAVIGATION panel, select > **Administration**.

The Node Manager and License Server panels will appear.

3. Select **License Server**.

   The **License Server-Administration** panel appears.

4. Select + to add a server.

   The **New Local License Server** window appears. Enter the following details:
   - **SERVER DISPLAY NAME:** Enter a name that displays as the License Server name.
   - **SERVER NAME (OR IP ADDRESS):** Enter the host name of the Local License Server in the <Fully Qualified Domain Name> format. Alternatively, you can enter the IP address of your device.
   - **PORT:** Enter the port number of the Local License Server. The default port number is 3333.

5. Select **Test** to check the connection establishment with the provided entries. If the status is *NOT CONNECTED*, validate the values entered. If the result is *CONNECTED*, proceed to select **Add**.

   The *License Server added successfully* message appears. If the activation codes for the product license(s) have already been added to the server, they will be displayed in the **Licenses activated on server** grid, which provides details such as the activation code, license description, total number of licenses, licenses in use, count of available licenses, and license expiration date. Additionally, the DETAILS panel display the Local License Server *(on page 104)* information.

Important:
When you add the Local License Server in the License Server, a connection with the Local License Server is established to add the activation codes to the server. Additionally, you can establish a connection with the Cloud Server to access available product activation codes. To establish the server connection, click on either Local License Server or Cloud Server below the License Server-Administration panel. However, you are restricted to connecting to only one server to activate the product licenses. If you have already added activation codes using the Local License Server, the network connectivity to the Cloud Server will not be established, and the Cloud Server icon will not appear in the License Details *(on page 57)* section. This indicates that the connection establishment to the Cloud Server is not available, and the option to add the product activation codes and activate them using the Cloud Server will be disabled in the Activate License *(on page 58)* details section of the Node Manager-Administration panel.

To activate activation codes from the Cloud Server, ensure that the Local License Server connection is not established in Configuration Hub. You can achieve this by not adding the Local

License Server in the Node Manager-Administration panel. This will allow you to add the product activation codes from the Cloud Server and activate them using the Activate License *(on page 58)* + button in the details section of the Node Manager-Administration panel.

Details of License Server

This topic describes how to view details of a local license server, and what you can modify.

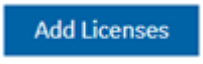
1. Add a server *(on page 102)* in the License Server-Administration panel, and then make sure it is selected in the License Server drop-down.
2. To view the Local License Server information, go to the DETAILS panel.
3. Optionally, you can modify the following details:
    - **GENERAL:**
        - Logging Threshold: It determines the level of detail logged by the system. You can select INFO, DEBUG, ERROR, or FATAL from the drop-down list.
        - Communication Timeout: It represents the timeout duration. You can modify the parameter value which indicates the maximum duration the system will wait for a response during communication processes.
    - **ADVANCE SETTING:** Select  .

      The **Configure server proxy** window appears. If required, you can modify the proxy server details and select **Apply** to establish the proxy server.
    - **SERVER SETTINGS:** Select  .

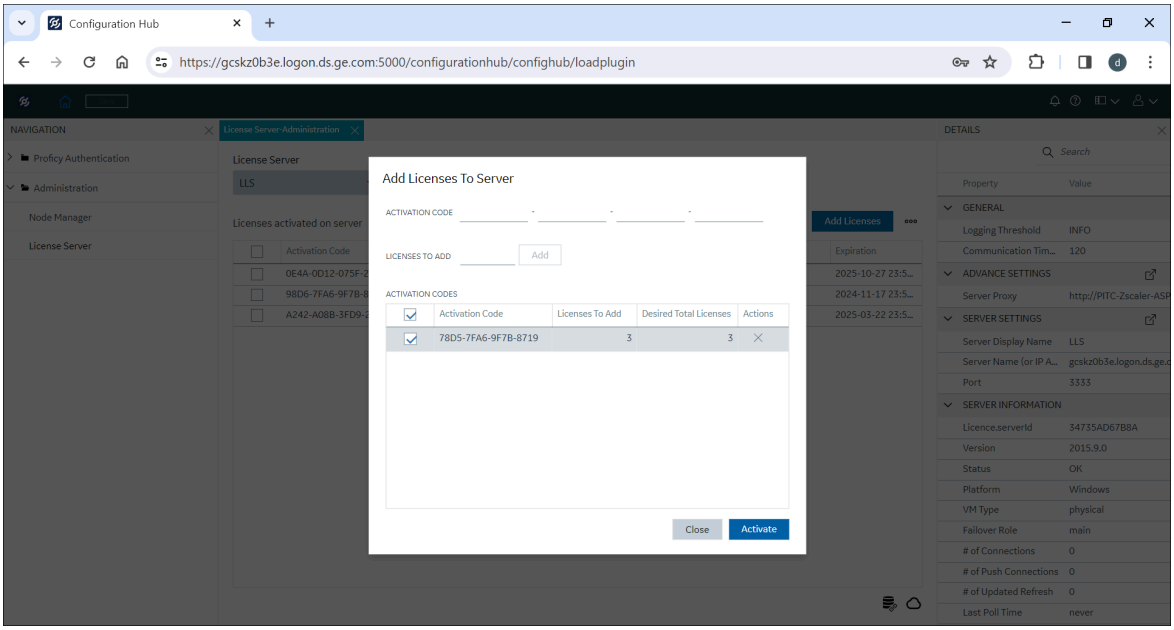
      The **Edit Local License Server** window appears. If required, you can modify the Server Name (or IP Address) and Port number.
    - **SERVER INFORMATION:** It provides the Local License Server information.
    - **CONNECTED CLIENTS:** It provides information on client devices that are currently actively connected to and using licenses from the Local License Server.

Adding an Activation code to the Server

This topic describes how to add Proficy product activation codes to the local license server.

1. Add a server *(on page 102)* in the License Server-Administration panel.
2. Select 

to add the product activation codes to the Local License Server. The Add Licenses to Server dialog box appears.



3. For each license you want to add, enter the product ACITIVATION CODE, and then enter number of licenses required in the LICENSES TO ADD field.
4. Click **Add**.

   These activation codes are added to the ACTIVATION CODES table. If you want to remove the license, select ✕ in the Actions column to remove the license.
5. When you are finished adding codes, select **Activate**.

   The *Activation code added successfully* message appears. You can view the added activation code(s) on the **Licenses activated on server** grid, which provides details such as the activation code, product description, total number of licenses, licenses in use, count of available licenses, and license expiration date.

Note:

Clicking the Refresh button on the License Server-Administration panel display updated information of **Licenses activated on server** grid.

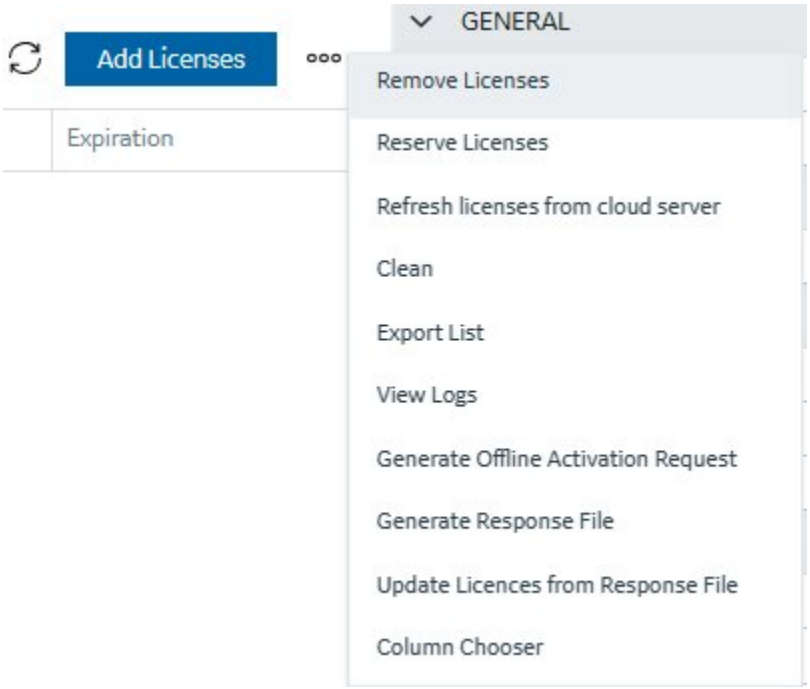
Manage Activation codes and Product Licenses

After adding the activation codes for the Proficy product licenses to the Local License Server, you can manage them by performing actions listed in the overflow icon ••• of the License Server-Administration panel.

The following are the actions that you can perform using the overflow icon ••• of the License Server-Administration panel:

- Removing Licenses *(on page 107)*
- Reserving Licenses *(on page 107)*
- Refresh Licenses from cloud server *(on page 108)*
- Cleaning Licenses *(on page 108)*
- Exporting product license information from the Local License Server *(on page 108)*
- Viewing, downloading, and accessing logs from the Local License Server *(on page 109)*
- Generating Offline Activation Requests *(on page 109)*
- Generating Response Files *(on page 109)*
- Updating Licenses from Response File *(on page 109)*
- Choosing a Column *(on page 110)*

The following figure shows how these options appear in the drop-down menu.



Add and Manage a License

1. Add a server *(on page 102)* in the License Server-Administration panel.
2. Add an activation code to the server *(on page 104)*.

3. Click the overflow icon ••• to perform the above actions and manage the activation codes of the product licenses.

> **Note:**
>
> Ensure that you have connectivity to both the Cloud Server and the Local License Server. Otherwise, the link to perform the actions will be disabled.

Remove Licenses

You can remove licenses from the Local License Server that are no longer in use.

- Select **Remove Licenses**.

  The **Remove Licenses from Server** window appears listing all the activated licenses.

- For each activation code, enter the number of licenses to delete from the server in the Remove column.
- Select **Remove**.

  The *Activation code removed successfully* message appears.

Reserve Licenses

You can reserve available licenses on a Local License Server to use at a later time. After you reserve a license, it is no longer accessible to any client.

- Select **Reservation Licenses**.

  The **Reserve Licenses from Server** window appears displaying the following columns:
  - **Total:** The total number of licenses on this server.
  - **Available:** The number of available licenses for clients connected to this server.
  - **Reserved:** The number of licenses currently reserved on this server for later use. Expired licenses remain in this column until you remove them.
  - **Desired Reserve:** The number of licenses that you plan to reserve on this server.
- In the Desired Reserve column, enter the number of licenses that you want to reserve for each desired product.

> **Note:**
> You can increase and decrease this number as well as enter a zero to clear the license from the reservation list.

- **Optional:** Select the overflow icon •••, and then select:
  - **Clear All Reservations** to remove all reservations.
  - **Reserve All** to reserve all available licenses for all products.
- Select **Reserve Licenses**.

The *Activation code reserved successfully* message appears.

Refresh Licenses from Cloud Server

You can refresh the licenses on the Local License Server to update them with any modifications made in the Cloud Server. Refreshing also retrieves any new licenses from the Cloud Server.

- Select **Refresh licenses from cloud server**.

The *Refresh from Cloud Server was updated successfully* message appears.

Clean

You can permanently remove all license information from the Local License Server. If you remove a license that is currently in use, you can no longer extend the lease on that license.

- Select **Clean**.

The **Clean licenses on Server** window appears with a following message.

Cleaning is irreversible. By clicking on the Clean Button, you agree on removing all existing licenses from your computer. These licenses will have to be reconfigured once the process is completed.

- Select **Clean**.

The *Your server was reset successfully* message appears.

Export List

You can download license information from the Local License Server.

- Select **Export List**.

  The **Export Licenses** window appears with the following export options:
  - Export As Text and
  - Export As CSV
- Select the export option as required and select **Export**.

  The license information is downloaded at `<location:\License_List.txt or csv>` and status message *File exported successfully* appears.

View Logs

You can view and download error logs as well as access logs from the Local License Server.

- Select **View Logs**.

  The **Server Administration - Logs** window appears, listing log-level types, message descriptions, and date and time stamps, with options to download logs.
- Select **Error**, **Access**, or **Transaction** log types separately, or choose all log types from the Download drop-down list.
- Select **Download**.

  The logs will be downloaded to `<location:\License Server Logs.zip>`.
- Select **Close**.

Generate Offline Activation Request

A Request file and a Response file are used as a medium between a computer having internet access and the Cloud Server to activate the licenses on the offline computer. Refer to the steps mentioned in Generate Offline Activation Request.

Generate Response File

Collect the request file from the offline computer and generate a response file from an online computer. Refer to the steps mentioned in Generate Response File.

Update Licenses from Response File

After generating a request file from your offline computer and a response file from an online computer, you can activate licenses on the offline computer. Refer to the steps in Update Licenses from Response File.

Column Chooser

The Column Chooser  option helps you customize the columns in the table according to your preferences.

- Select **Column Chooser**.

  The **Column Chooser** window appears.
- Choose the columns that you want to view in the table by selecting the check boxes next to them (Activation Code, Description, Total, In Use, Available Licenses, Expiration, and Product Name) or clear the check box if you do not want to view it.
- Select  to close the Column Chooser window.

  The selected columns will be displayed on the table.

High Availability for Configuration Hub

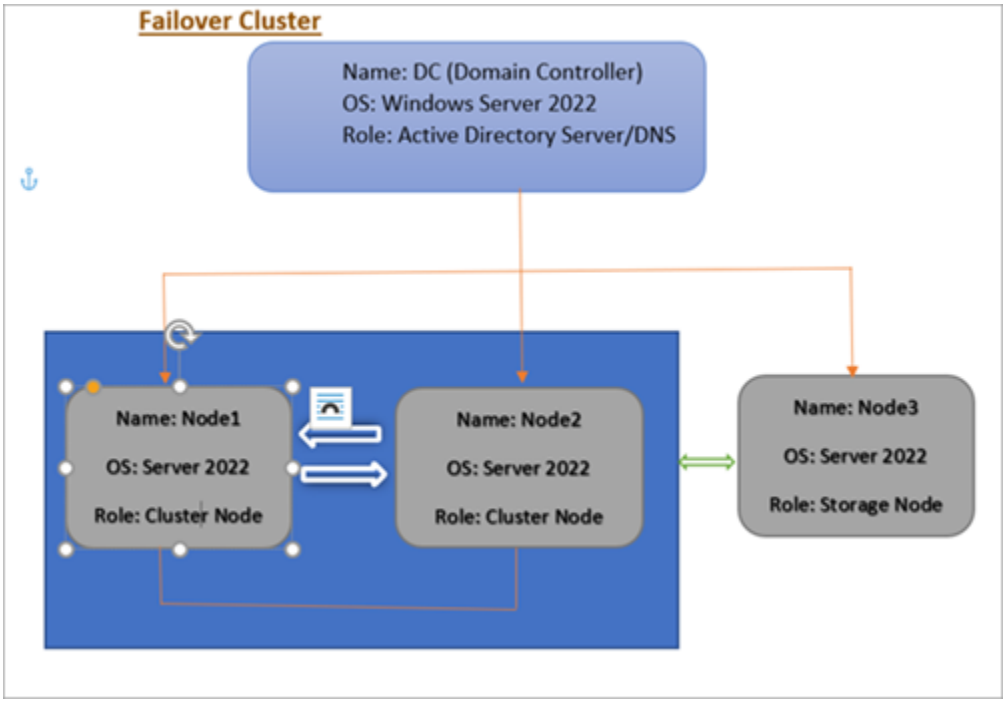
Overview of High Availability in Configuration Hub

This topic provides an overview of a clustered environment for high availability for Configuration Hub. It does not cover SCADA Enhanced Failover. iFIX Failover should not be used on a node participating in this High Availability configuration. See Special Considerations for SCADA Enhanced Failover *(on page 305)* for details on SCADA Enhanced Failover with Configuration Hub.

High availability (HA) is the ability of a system to operate continuously without failing for a designated period of time. HA works to ensure a system meets an agreed-upon operational performance level. The following sections describe how high availability works with Configuration Hub.

About Failover Cluster

In a cluster environment, multiple servers are installed, which share the same data. Each of these servers is called a node. One of them acts as the primary node, while the others are standby nodes. If the primary node is down, one of the standby nodes is used.



For example, if Configuration Hub on the primary node is unable to connect to the server, then the user session on the standby node is activated. Therefore, you will still be able to connect to the server using Configuration Hub installed on the standby node.

Configuration Hub works with Microsoft Failover Cluster Manager to ensure high availability of web-based clients. The following services are shared between the primary and standby nodes in a cluster. Using Failover Cluster Manager, you must add these services to the cluster.

- `ConfighubContainerService`
- `ConfigHubHttpdService`

Refer to Configure High Availability for Configuration Hub *(on page 112)*.

For additional information on Windows failover clustering, visit the following links:

- https://docs.microsoft.com/en-us/windows-server/failover-clustering/create-failover-cluster#install-the-failover-clustering-feature
- https://www.papercut.com/support/resources/manuals/ng-mf/common/topics/cluster-server-2012-2016.html#Create

Configure High Availability for Configuration Hub

This topic describes how to set up a highly available server for Configuration Hub using Windows failover cluster.

You need:

- Two Windows Server 2022 virtual machines to serve as nodes in a cluster:
  - Primary node (Node1)
  - Secondary node (Node2)

  Ensure that both the nodes (primary and secondary) have the same domain name, and are installed with the same version of Windows Server.
- One Windows Server 2022 virtual machine (Node3) in the same domain.

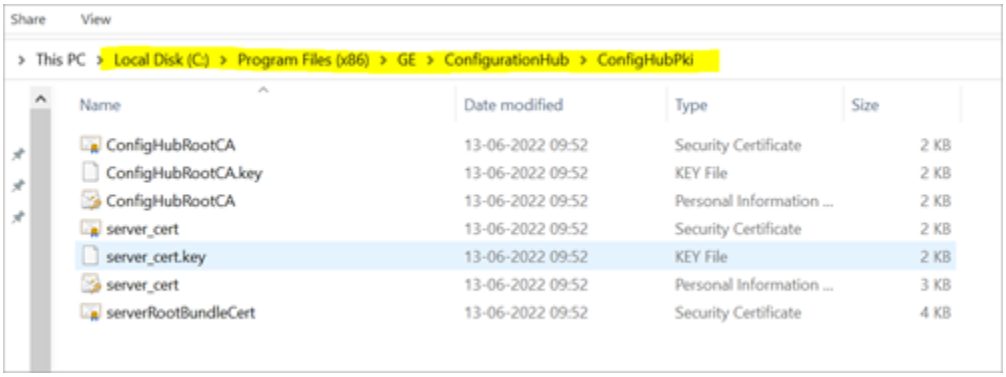
  Create a shared drive on this node, which both the nodes in the cluster can access.
- During installation, provide the same Configuration Hub credentials in both the nodes. Use the same cluster name created in the Windows failover cluster manager.

Perform the following tasks to set up high availability for Configuration Hub using a two-node failover cluster.

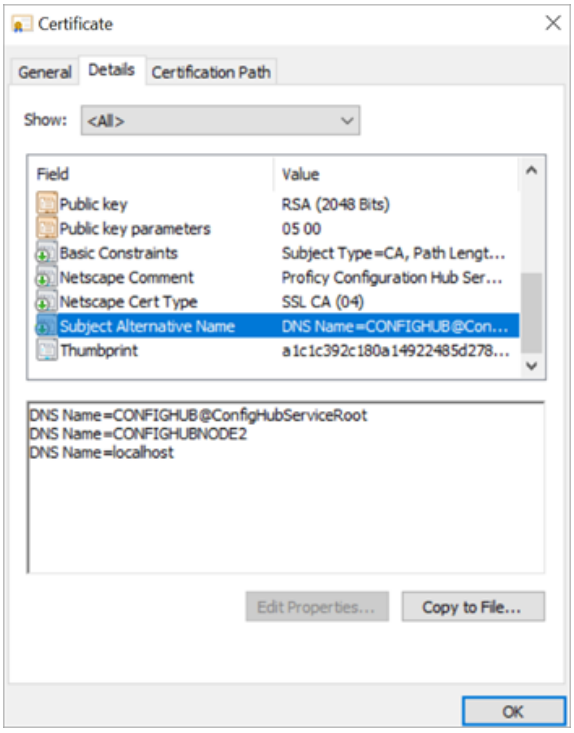
1. Install Failover Clustering Feature *(on page 114)*
2. Create Failover Cluster *(on page 115)*
3. Create Role *(on page 119)*
4. Create Client Access Point (Virtual IP) *(on page 122)*
5. Add Dependencies to Role *(on page 124)*
6. Create Network Attached Storage *(on page 125)*
7. Install Configuration Hub on Cluster Nodes *(on page 128)*
8. Handling Silent Installation *(on page 132)*

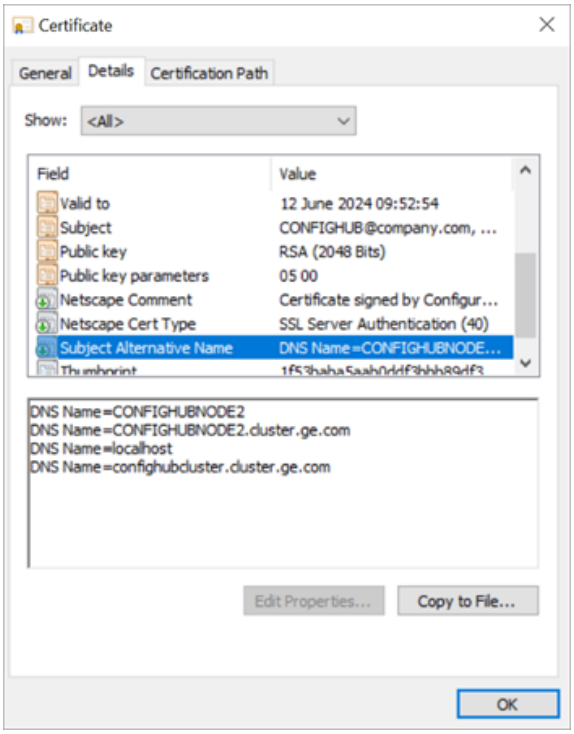
When Configuration Hub is installed on a node server (for example, Node1):

- `ConfigHubRootCA.crt` and `ConfigHubRootCA.key` files are created in the `ConfigHubPki` folder using Node1 DNS name Configuration Hub ports.
- Using the above root certificates, `server_cert.crt` and `server_cert.key` files are created to access the application.



- The Configuration Hub cluster name parameter is sent to the `RegisterConfighub_httpd.bat` for creating certificate 'subject alternative names' using the cluster name.





- Two extra parameters are introduced to capture 'cluster name' and 'domain name' if high availability is set up for Configuration Hub. The root certificates and server certificates are created using the extra parameter like 'cluster name'. All cluster nodes certificates have the same 'cluster name' so users can access all the nodes without any certificate issues.

RegisterConfigHub_httpd.bat

```
REM Parameters
REM %1  httpd root directory
REM %2  full path to httpd.exe
REM %3  confighub root directory
REM %4  storage service port
REM %5  container service port
REM %6  full qualified domain name
REM %7  DNS Name 1
REM %8  DNS Name 2

ECHO %1 %2 %3 %4 %5 %6 %7

cd /d %3
REM call config_service_cert.bat %3 %4 %5 ConfigHubRootCA server_cert proficy %6
if  [%7%] == []  (
 call config_service_cert.bat %3 %4 %5 ConfigHubRootCA server_cert proficy %6) ELSE (
 if NOT [%8%] == [] (
 call config_service_cert.bat %3 %4 %5 ConfigHubRootCA server_cert proficy %6 %7 %8 ) ELSE (
 call config_service_cert.bat %3 %4 %5 ConfigHubRootCA server_cert proficy %6 %7 ) )

cd /d %1
set HTTPD_PATH=%1
nssm install "ConfigHubHttpdService" %2
nssm set "ConfigHubHttpdService" ObjectName Network Service
REM PAUSE
REM nssm set "ConfigHub Httpd Service" Start SERVICE_AUTO_START
REM nssm set "ConfigHub Httpd Service" AppDirectory %HTTPD_PATH%
nssm set   "ConfigHubHttpdService" Description "WebServer for Configuration hub."
```

- Configuration Hub installer copies `ConfigHubRootCA.crt` and `ConfigHubRootCA.key` files into shared configuration. These are used in the other nodes for creating `server_cert.key` and `server_cert.key` files and maintains a trust between both nodes.
- While installing Configuration Hub on other cluster nodes, the system checks if any root certificates exist in the given shared configuration path or not. If certificates exist, then copies both `ConfigHubRootCA.crt` and `ConfigHubRootCA.key` into the local machine `ConfigHubPki` folder of Configuration Hub, and then creates server certificates using the root certificates.

Install Failover Clustering Feature

This topic describes how to install the failover clustering feature on the nodes.

Perform these steps on both the server nodes (Node1 and Node2).

1. Log in to the node server.
2. Go to **Start > Administrative Tools > Server Manager**.
3. From the Server Manager dashboard, select **Manage > Add roles and features**.
4. Complete **Add Roles and Features Wizard** with these options:

Section	What To Do
Before You Begin	Skip to the next section.
Installation Type	Select **Role-based or feature-based installation**.

Section	What To Do
Server Selection	a. Choose the option **Select a server from the server pool**. b. Under the server pool section, select your Node1 server. This means you will be installing the role/feature on this server.
Server Roles	In the roles list box, select the check box for **File and Storage Services**.
Features	To allow the installation of Failover Cluster Manager: a. In the features list box, select the check box for **Failover Clustering**. The **Add features that are required for Failover Clustering?** screen appears, which shows the dependencies that are installed with this feature. b. Select **Add Features**.
Confirmation	Select **Install**.

The selected role and feature is installed on the server node.

5. When the installation is complete, restart the machine.

After completing the steps in this topic, the failover clustering feature is installed on all the server nodes you want to include in the failover cluster.

Create Failover Cluster *(on page 115)*

Create Failover Cluster

This topic describes how to create a failover cluster.

Install Failover Clustering Feature *(on page 114)*

You can perform these steps on either Node1 or Node2. Suppose you perform these steps on Node1, they are automatically applied to Node2.

1. Log in to the server node.
2. Go to **Start > Administrative Tools > Failover Cluster Manager**.
3. In Failover Cluster Manager, select **Validate a Configuration**.

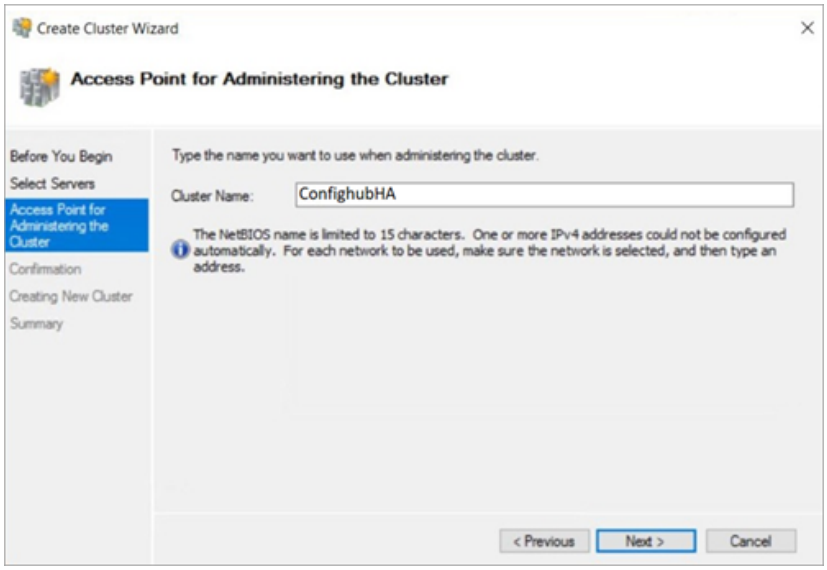
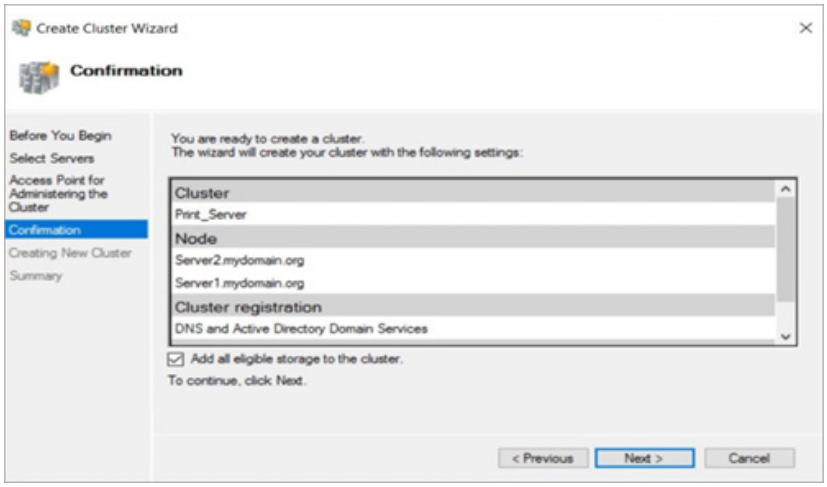
Before starting to create a cluster of nodes, you should validate whether the nodes that you are adding to the cluster are compatible with the cluster hardware requirement. For more information, refer to Microsoft documentation.

4. Complete **Validate a Configuration Wizard** with these options:

Section	What To Do
Before You Begin	Skip to the next section.
Select Servers or a Cluster	Browse and locate the nodes you want to add to the cluster. For example, `confighubnode1.cluster.ge.com` and `confighubnode2.cluster.ge.com` For resolving server related issues, see Troubleshooting *(on page 115)*.
Testing Options	Select **Run all tests (recommended)**.
Confirmation	Review the list of tests run on the selected servers. The number of tests run are based on the roles installed on the server nodes.
Validating	This process may take several minutes depending on your network infrastructure, and the number of server nodes selected for validation.
Summary	a. Select **View Report**. b. Review **Failover Cluster Validation Report** and fix any failed validations. You can ignore expected warnings. The validation report should be free of any errors, otherwise the cluster setup will not be successful. c. Select **Finish**.

5. In Failover Cluster Manager, select **Create a Cluster**.
6. Complete **Create Cluster Wizard** using these options:

Section	What To Do
Before You Begin	Skip to the next section.
Select Servers	Nodes were already added during validating the configuration process. Skip to the next section.
Validation Warning	Select **No**. We already validated the nodes in the previous steps.

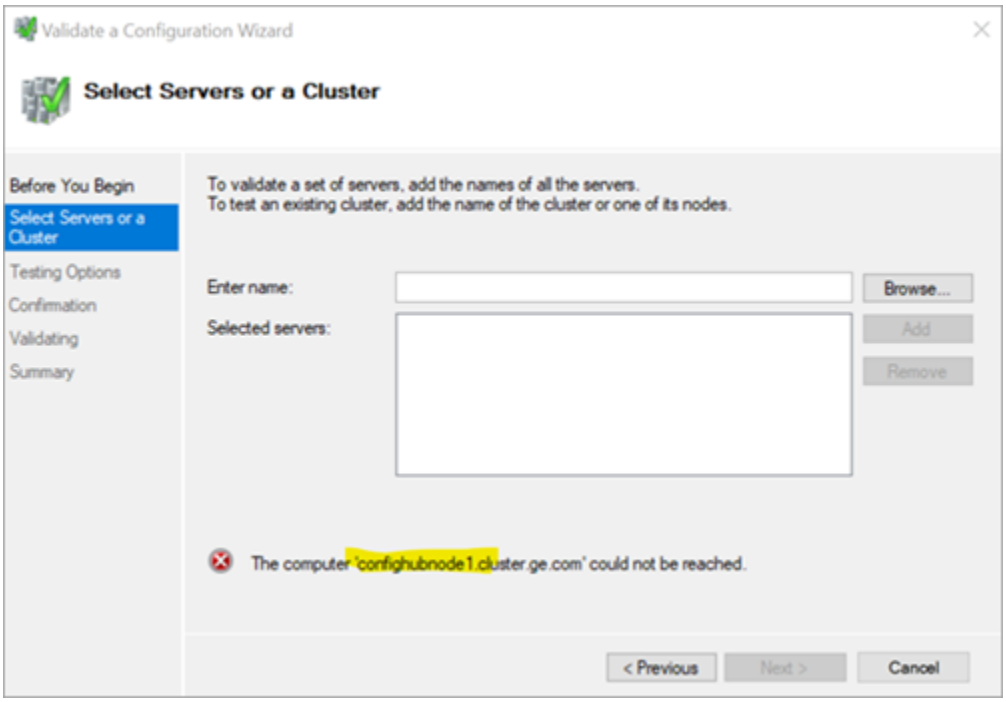
Section	What To Do
Access Point for Administering the Cluster	Enter a unique name for your cluster. 
Confirmation	This screen lists the settings to be applied to your new cluster. Select the check box for **Add all eligible storage to the cluster**. The system will now try to assign any storage it can find. 
Creating New Cluster	This process may take a while as there are several checks that must be run, and tests that are conducted while the system is configured. **Note:** You may receive node cleanup failed errors at this stage (not detected during validation stage). Run the following com-

Section	What To Do
	mand in all the cluster nodes, and then attempt to create the cluster. You need to execute this command in the administrative mode of Windows power shell. `> Clear-ClusterNode -Name confihubnode1.cluster.ge.com -Force`
Summary	When the process is complete, select **Finish**.

After completing the steps in this topic, a new cluster is created in your network domain.

To verify that the cluster is configured correctly, navigate to **Nodes** in the Failover Cluster Manager. Check that all nodes in the cluster are online. If they are not, go to the server that is offline, and bring the system online to join the cluster.

Troubleshooting Errors:



While adding the cluster nodes, if you get the above error, you need to do the following and attempt to add the clusters again:

- Disable the firewall on both the nodes.
- Add DNS name in the `hosts.conf` file.

```
# localhost name resolution is handled within DNS itself.
#       [redacted]       localhost
#       ::1              localhost
[redacted]  htclab.ge.com
[redacted]  htclab.ge.com
[redacted]  confighubnode1.cluster.ge.com
[redacted]  confighubcluster
```

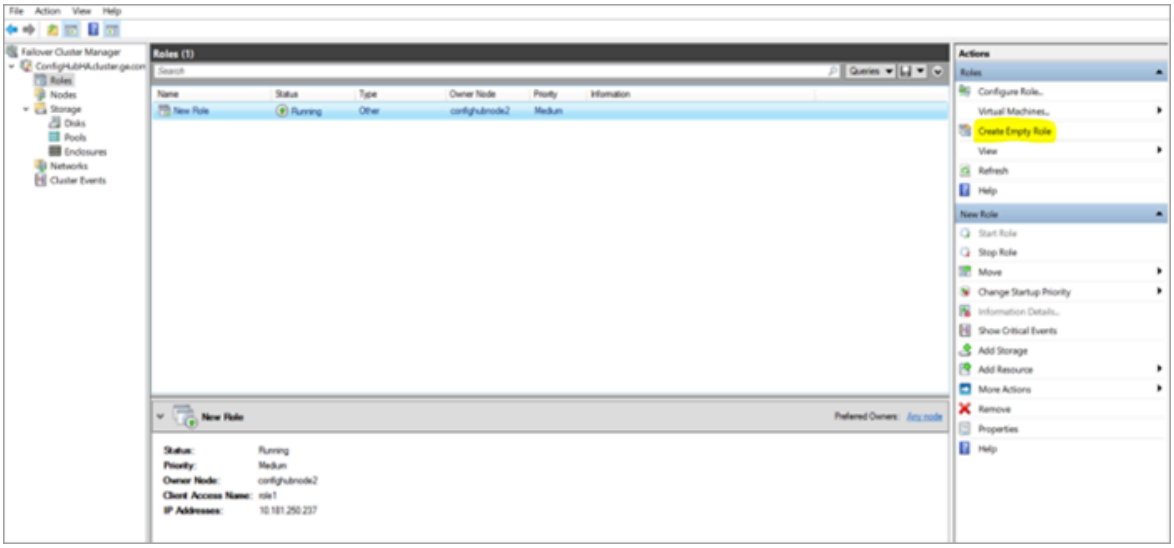
Create Role *(on page 119)*

Create Role

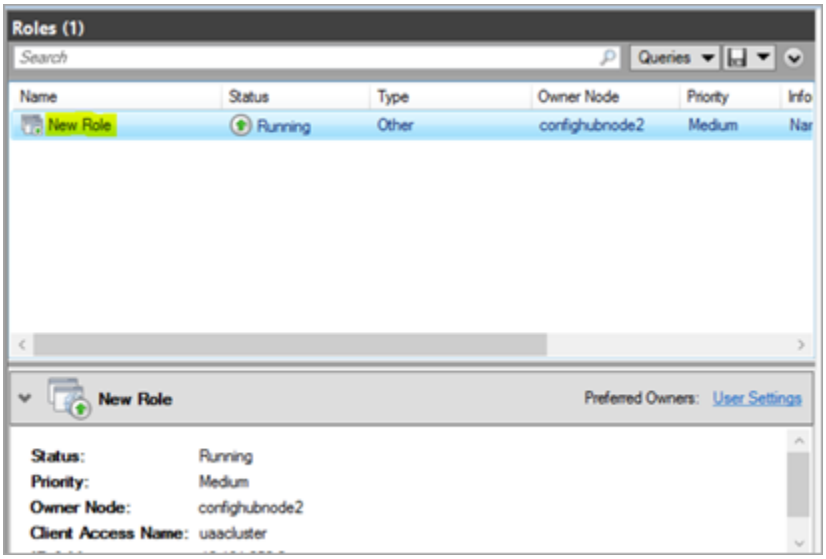
This topic describes how to create a role.

Create Failover Cluster *(on page 115)*

1. In Failover Cluster Manager, expand your cluster name and select **Roles**.
2. Right-click **Roles** and select **Create Empty Role**, (or) select under **Actions** as shown here:

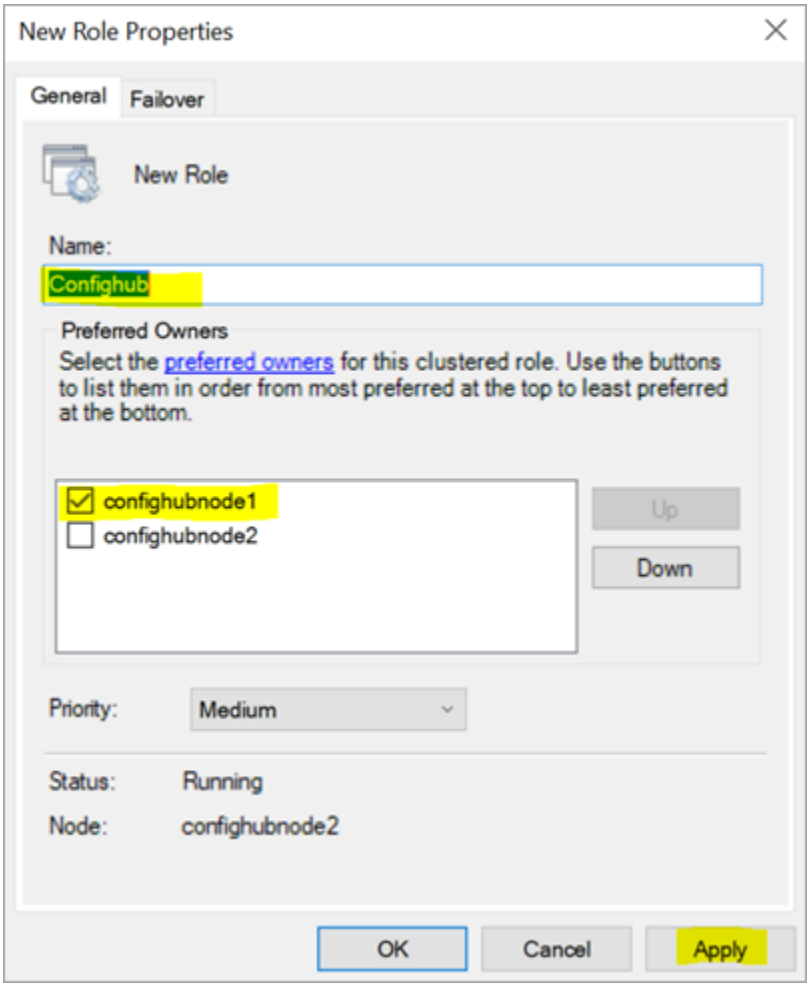


   An empty role is created with primary node pointing to the active cluster node. The newly created empty role appears in the Roles pane with the name `New Role`.
3. Right-click `New Role` and select **Properties**.



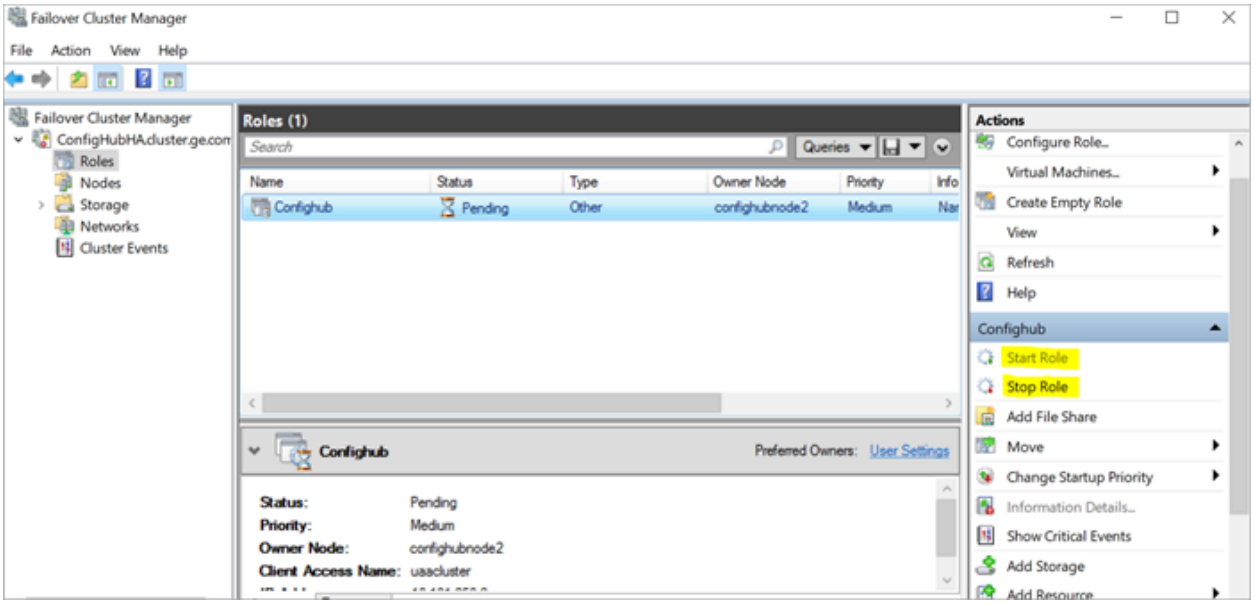
The **New Role Properties** screen appears.

4. Enter a valid name, and select the primary node to access the application, and then apply the changes.



After completing the steps in this topic, the newly created empty role is renamed.

If the role is in offline mode, you can manually start this role using the failover cluster. Use the options **Start Role** and **Stop Role** to start or stop the cluster roles.



See also Move Role *(on page 122)*.

Create Client Access Point (Virtual IP) *(on page 122)*

Move Role

This topic describes how to move a role from one node to another.

Create Role *(on page 119)*

When you shut down a server node in a cluster, the role automatically moves to the next available node. You can also move the role manually (without shutting down the current node) to another node with these steps.

1. In Failover Cluster Manager, select the (renamed) empty role, and from the right pane, select **Move**.
   The **Move Clustered Role** screen appears.
2. Select the node to which you want to move the role and select **OK**.
   The cluster now points to the selected node and serve the results from selected node

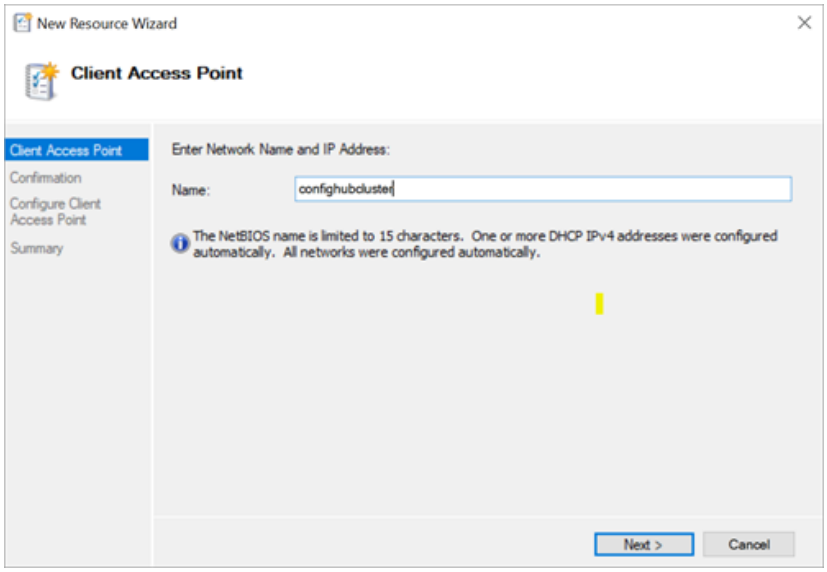
Create Client Access Point (Virtual IP)

This topic describes how to create a client access point.

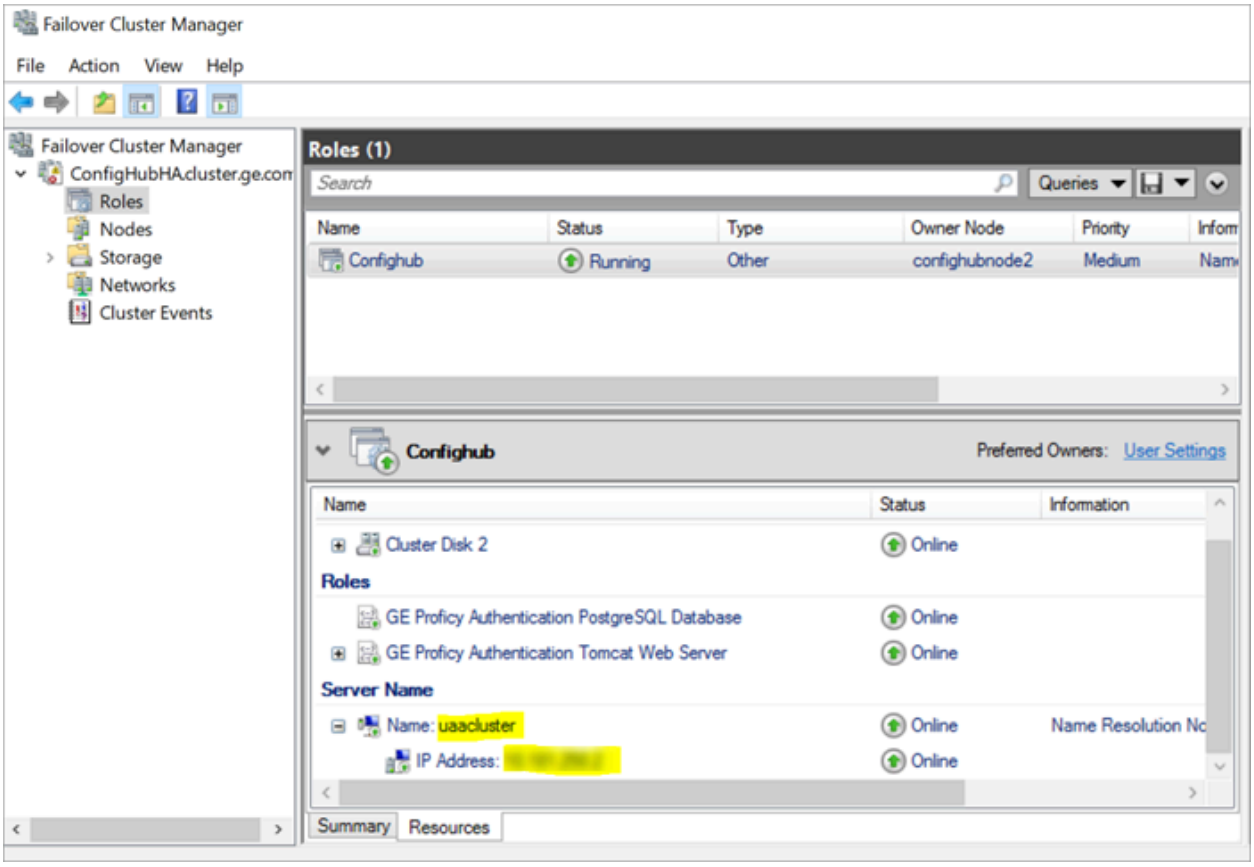
Create Role *(on page 119)*

The client access point is a virtual IP address and a corresponding DNS name that allows to access the Configuration Hub application.

1. In Failover Cluster Manager, right-click the (renamed) empty role and select **Add Resource > Client Access Point**.
2. Complete **New Resource Wizard** with the following options.

Section	What To Do
Client Access Point	Enter a name. This name (DNS) will be used to access the Configuration Hub application. 
Confirmation	The network name and IP address are displayed for confirmation.
Configure Client Access Point	Verifies the validity of the client access point settings and creates a new resource.
Summary	Select **Finish**.

After completing the steps in this topic, a virtual IP address is created to access the application.



Add Dependencies to Role *(on page 124)*

Add Dependencies to Role

This topic describes how to add dependency services to a role.

Create Client Access Point (Virtual IP) *(on page 122)*

On adding dependency services to a role, services restart whenever the role is switched to a different node (failover condition).

1. In Failover Cluster Manager, right-click the (renamed) empty role and select **Add Resource > Generic Service**.
2. Complete **New Resource Wizard** with the following options:

Section	What To Do
Select Service	In the services list, select the dependency service to add to the role.

Section	What To Do
	
Confirmation	Skip to the next section.
Configure Generic Service	Skip to the next section.
Summary	Select **Finish**.

Note:
Windows failover cluster starts the generic services in whichever node is currently active. It stops these generic services on all other nodes. When you switch the cluster nodes, then automatically Windows failover cluster starts the services in the new active node, and stops in all other nodes.

After completing the steps in this topic, dependency services are added to the role. See also Move Role *(on page 122)*.

Create Network Attached Storage *(on page 125)*

Create Network Attached Storage

This topic describes how to create a Network Attached Storage (NAS).

Log in to the Node3 Windows server machine.

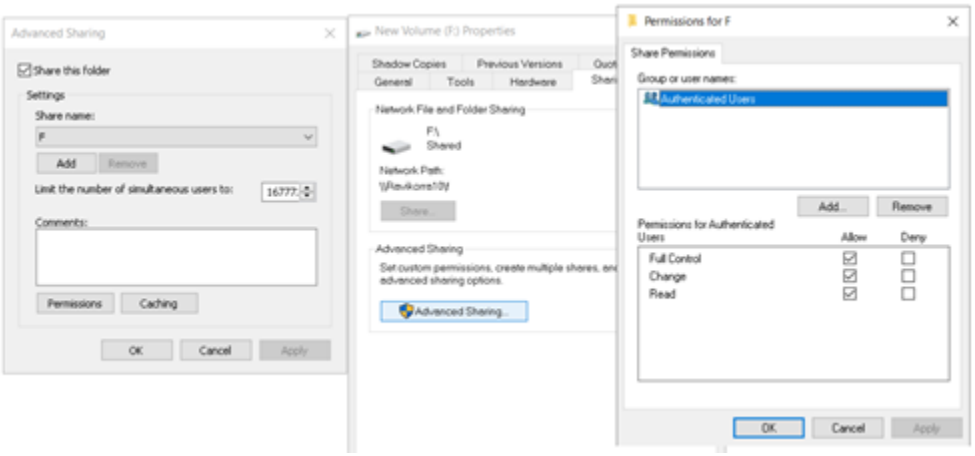
1. Create a shared folder on Node3.
2. To make the shared folder a central storage location, give full permission to the drive.

    a. Right-click the drive and select **Give access to > Advanced sharing...**.
    The **Properties** dialog appears.

b. Select **Advanced Sharing...**.
   The **Advanced Sharing** dialog appears.

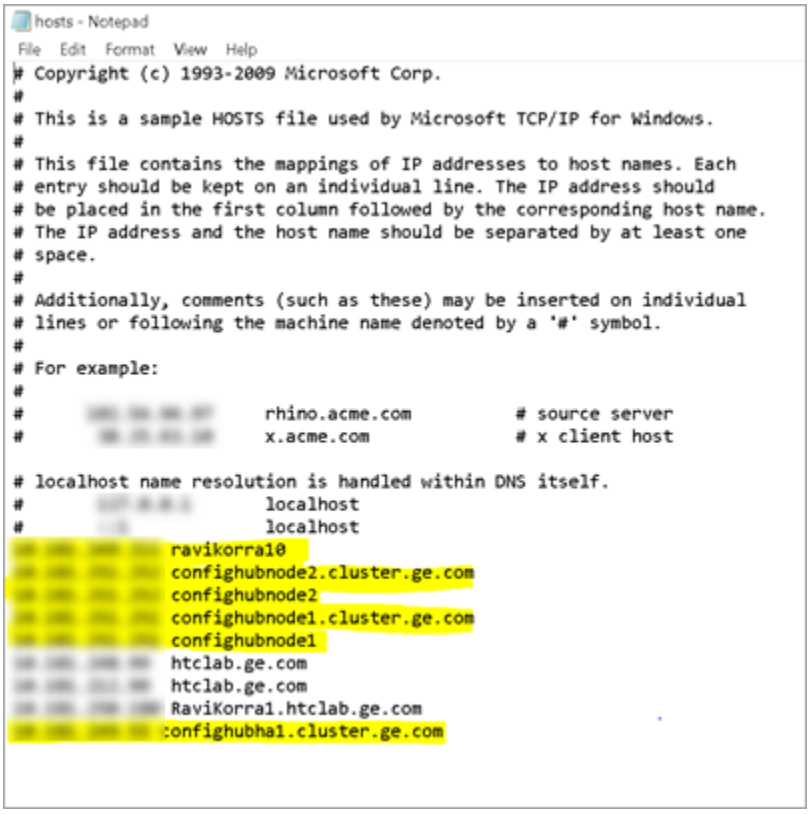
c. Select the check box for **Share this folder**, and then select **Permissions**.
   The permissions dialog for the drive appears.

d. Select the group/user, and then select the check box for **Full Control**.



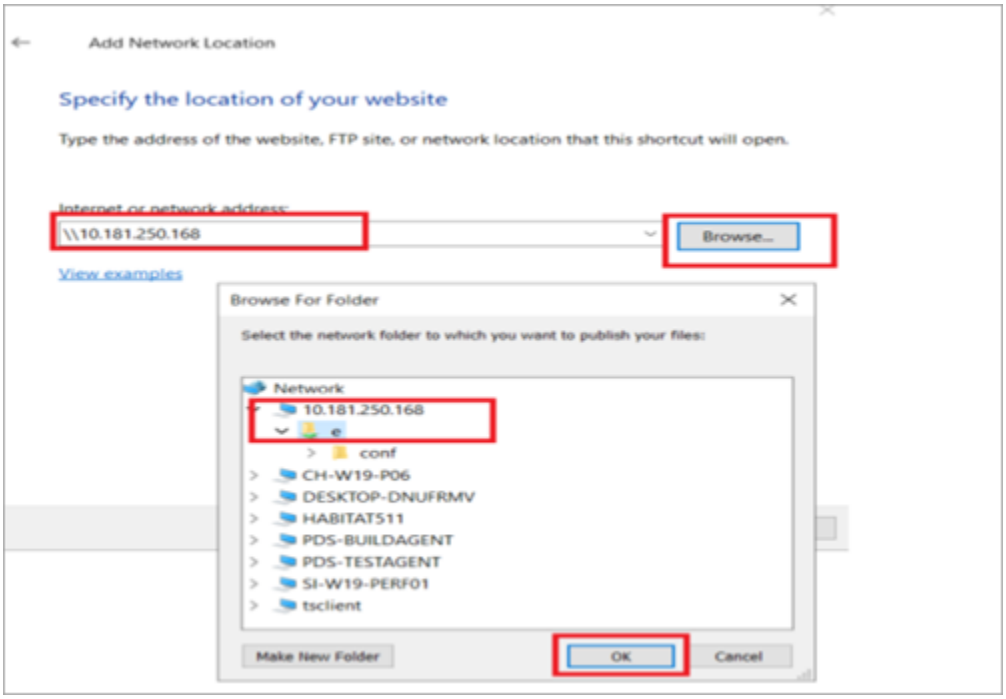
During Configuration Hub installation, we will select this drive to store common data across the nodes in a cluster.

3. Add cluster nodes IP address and FQDN in the shared VM `hosts.conf` file. Also add shared VM IP address and FQDN to the hosts file.

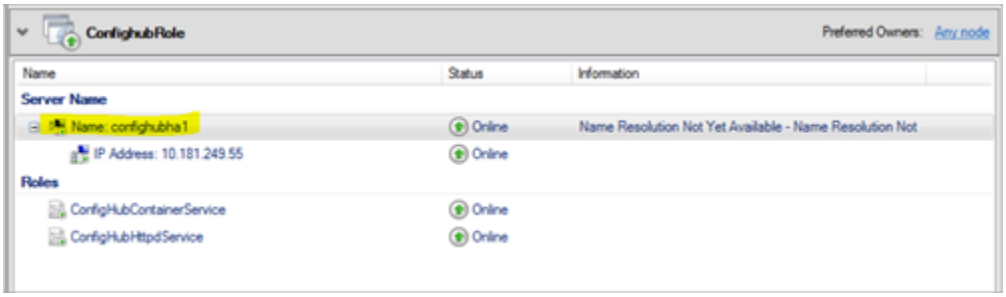


4. Log in to Node1 and Node2 servers and attach the shared drive.

   Here we can give either the IP address or FQDN to access the shared drive.



5. Access the Configuration Hub application using the virtual IP address.
   In the following example screenshot, Configuration Hub cluster virtual IP address is DNS name.
   FQDN: `confighubha1.cluster.ge.com`



   You can either access with virtual IP address or domain name.

   For example, access the Configuration Hub application with `https://confighubha1.cluster.ge.com:5200/` from any network.

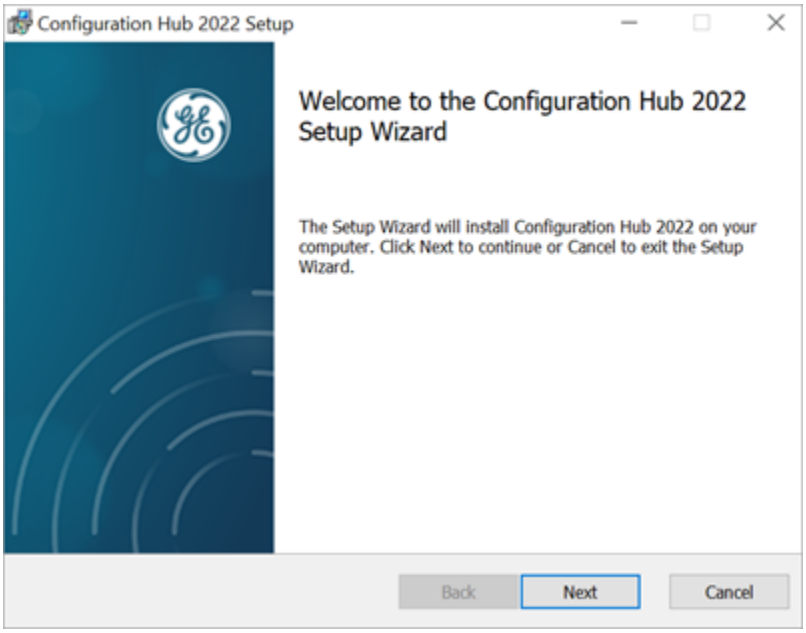
Install Configuration Hub on Cluster Nodes

This topic describes how to install Configuration Hub in a high available environment.

Log in to a cluster node.

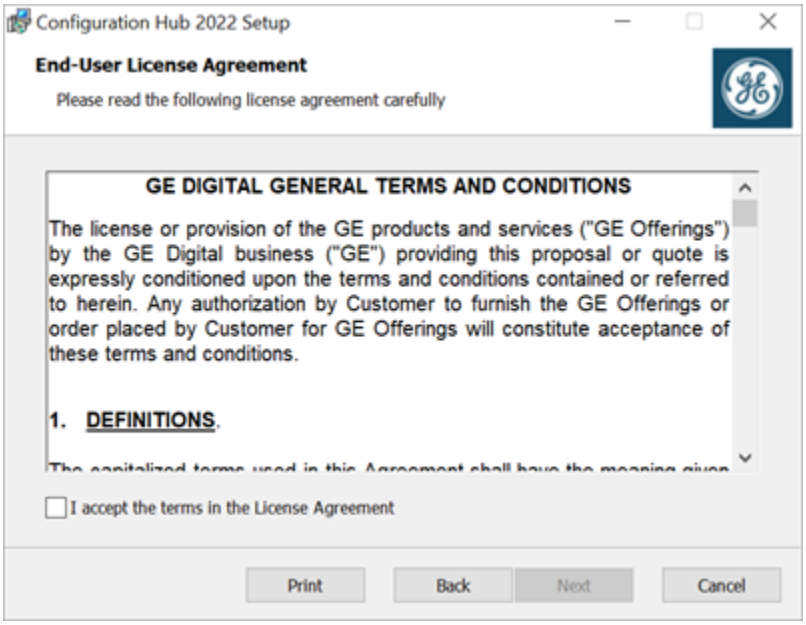
Follow these steps to install Configuration Hub on all the cluster nodes. You can access the application using the virtual IP address.

1. Run the Configuration Hub installation setup.
   The welcome screen appears.



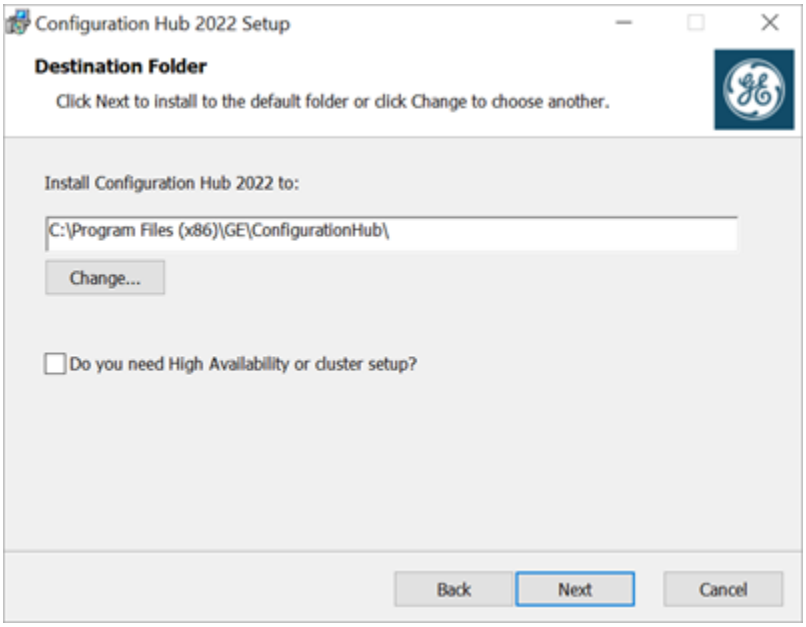
2. Select **Next**.

   The license agreement screen appears.



3. Select the check box for **I accept the terms in the License Agreement**, and then select **Next**.

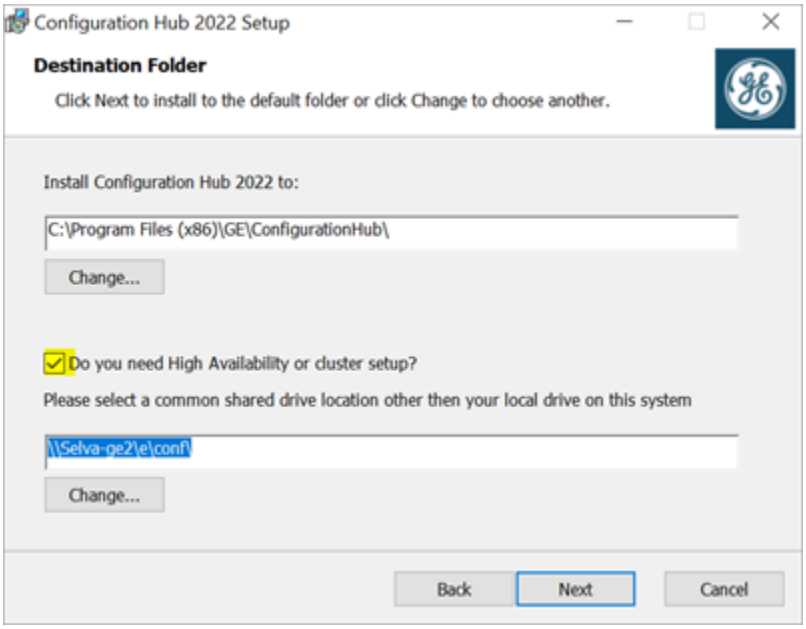
   The destination folder selection screen appears.



4. Complete the following and select **Next**.

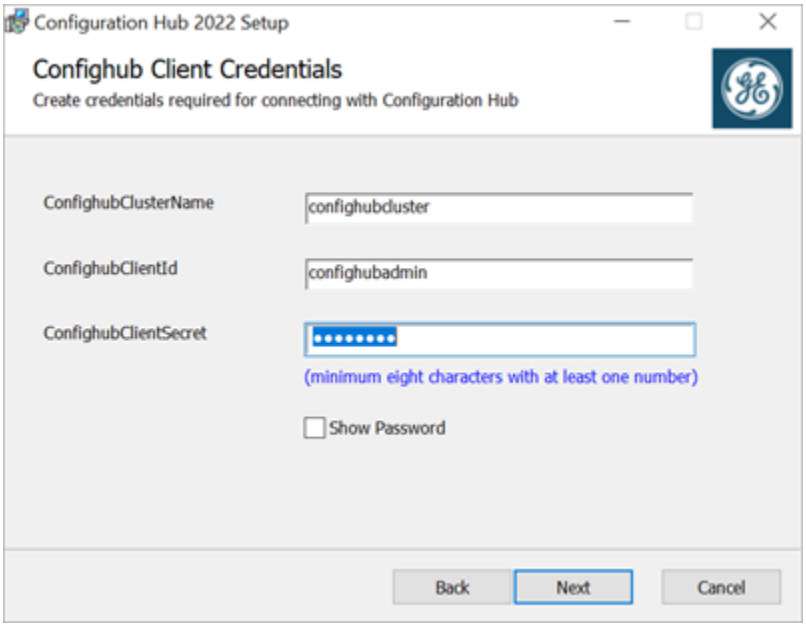
Field Name	What to do
Install Configuration Hub <version> to:	Proceed with the default install location, (or) select **Change...** to specify a different location path for installation.
Do you need High Availability or cluster setup?	Select the check box.

Options to set destination folder for shared configuration appears.

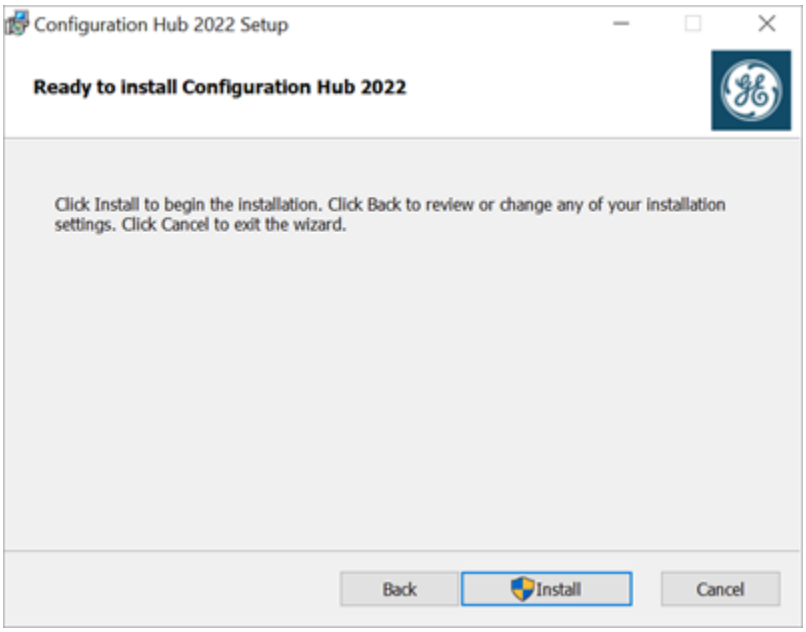


5. Enter the mapped shared network folder path, and then click **Next**.
   The application client credentials screen appears.
6. Complete the following and select **Next**.

Field Name	What to do
ConfighubClusterName	Enter the cluster name created for high availability.
ConfighubClientId	Enter the client ID to log in to the Configuration Hub application.
ConfighubClientSecret	Enter the secret password to authenticate the client for logging in to the Configuration Hub application.



7. Select **Install**.



All binaries are installed on to the selected node. The shared configurations are installed on to the shared configuration path. Configuration Hub application shortcuts are created on all the cluster nodes using the virtual DNS name.

Handling Silent Installation

This topic describes how to perform a silent install of Configuration Hub in a high available environment.

These are the prerequisites for an HA silent install:

1. All the cluster VMs should have Windows server with any version.
2. Windows Failover cluster is setup on all the cluster nodes.
3. Provide a full access to shared drive on any other VM, and mount that drive in all cluster nodes manually as per the network attached storage drive setup.
4. Create a client access point under Windows failover cluster role. Use this as the cluster name or virtual DNS name to access to the Configuration Hub application. Give the same name for silent install command parameter.
5. Provide the port for the Configuration Hub web server.

You need to run the command on all the cluster nodes.

1. Open Windows command prompt as an administrator.
2. Run the following command for fresh installs of Configuration Hub:

```
ConfigHubInstaller.msi /quiet WIXUI_CHB_CLIENTSECRET=admin123 ISINSTALLHASHAREDRESOURCE=1
 WIXUI_CHB_CLUSTERNAME=confighubcluster                          SHAREDCONFINSTALLFOLDER="\\Selva-ge2\e\conf"
```

These are the required command parameters for silent installation in high availability:

Note:
To achieve Configuration Hub high availability, the following parameter values must match on all the nodes.

Parameter	Description
`ISINSTALLHASHAREDRESOURCE=1`	Check box value to select Configuration Hub run on HA environment.
`WIXUI_CHB_CLUSTERNAME=confighubcluster`	Enter the name of your Windows failover cluster.
`SHAREDCONFINSTALLFOLDER="\\Selva-ge2\e\conf"`	Enter the shared configuration path, which contains Configuration Hub authentication and reverse proxy configuration. This configuration is shared by all cluster nodes and used when switching the nodes.

These are optional command parameters:

- `WIXUI_CHBHTTPD_PORT = 5000`
- `WIXUI_CHBCON_PORT = 4890`
- `WIXUI_CHB_CLIENTSECRET = " "`
- `WIXUI_CHB_CLIENTID = "confighubadmin"`
- `INSTALLFOLDER = "C:\Program Files (x86)\Proficy\ConfigurationHub"`

3. After installing Configuration Hub on all the cluster nodes, do the following:

    a. Add Configuration Hub services like `ConfigHubHttpdService` and `ConfigHubContainerService` to Windows failover cluster nodes.
    These services will restart whenever nodes are switched in Windows failover cluster.

    b. Perform a setup authentication on any node (in a cluster).
    Once the authentication is set up on one node, it automatically applies to all the cluster nodes since they share the configuration.

Any plug-in registered on the primary node will also load on other stand by nodes as well.

Chapter 3. Proficy Authentication

About Proficy Authentication

Proficy Authentication (UAA) provides identity-based security for Proficy based applications and APIs. It supports open standards for authentication and authorization, including OAuth2. Proficy Authentication is designed to operate on a cloud-native architecture, aligning with Cloud Foundry's principles for agility and efficiency. Visit Cloud foundry for more information. Organizations can easily deploy, manage, and scale Proficy Authentication within the Cloud Foundry environment, streamlining the operational aspects of authentication and access management. The application also offers a secure and efficient user authentication experience, making it ideal for mission-critical applications where reliability is paramount.

Several Proficy products use Proficy Authentication, including Historian, Plant Applications, and Operations Hub. You can configure Proficy Authentication from within Configuration Hub.

Proficy products can share an existing common Proficy Authentication (UAA) instance, which allows for all products to use a central User store for authentication and authorization.

Proficy Authentication can be configured to collaborate with external identity providers that use these two common protocols:

- Lightweight Directory Access Protocol (LDAP)
- Security Assertion Markup Language (SAML)

When Proficy Authentication is integrated with an external identity provider, it enables users and groups managed by that provider to access Proficy products and features. This means that the authentication and authorization established by the external identity provider extend to various services within the ecosystem.

OAuth is designed as an authorization protocol permitting a user to share access to specific resources with a service provider.

Benefits of using OAuth:

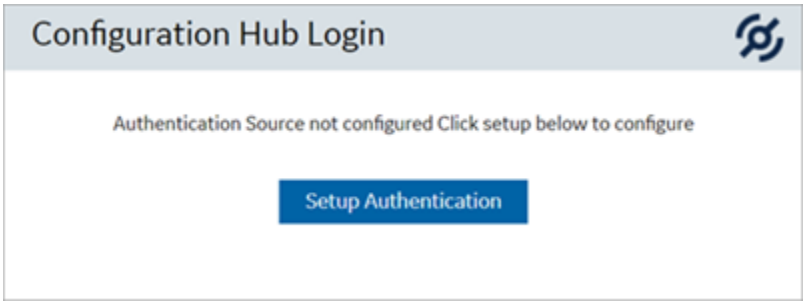
- Enables third-party application access
- Controlled access to APIs
- Adaptable and flexible user interactions

Set up Proficy Authentication

This topic describes how to set up Proficy Authentication in Configuration Hub.

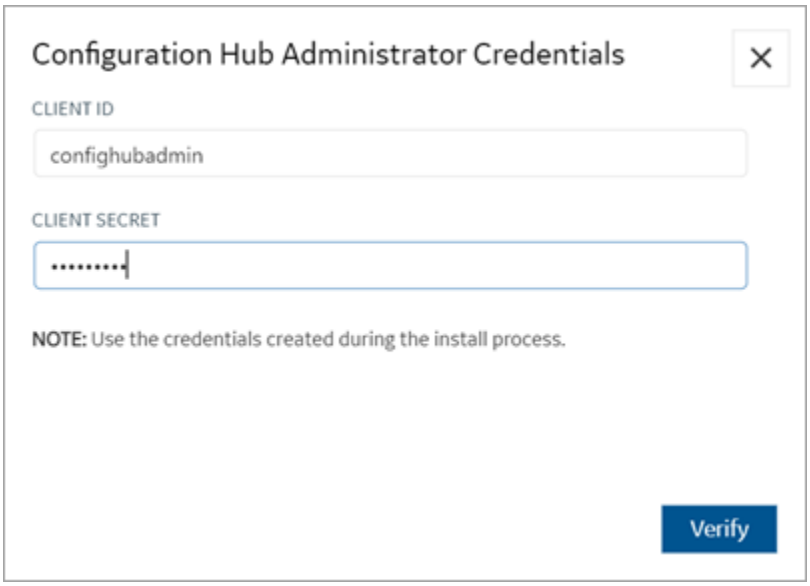
The following steps describe how to set up Proficy Authentication in Configuration Hub. Setting up authentication provides access to all the products (Historian, iFIX) registered with Configuration Hub. You use the same Proficy Authentication server to authenticate.

1. Double-click desktop icon to launch the Configuration Hub application.
2. Select **Setup Authentication**.



   The **Configuration Hub Administrator Credentials** screen appears.
3. Enter the details for logging in to the Configuration Hub application.

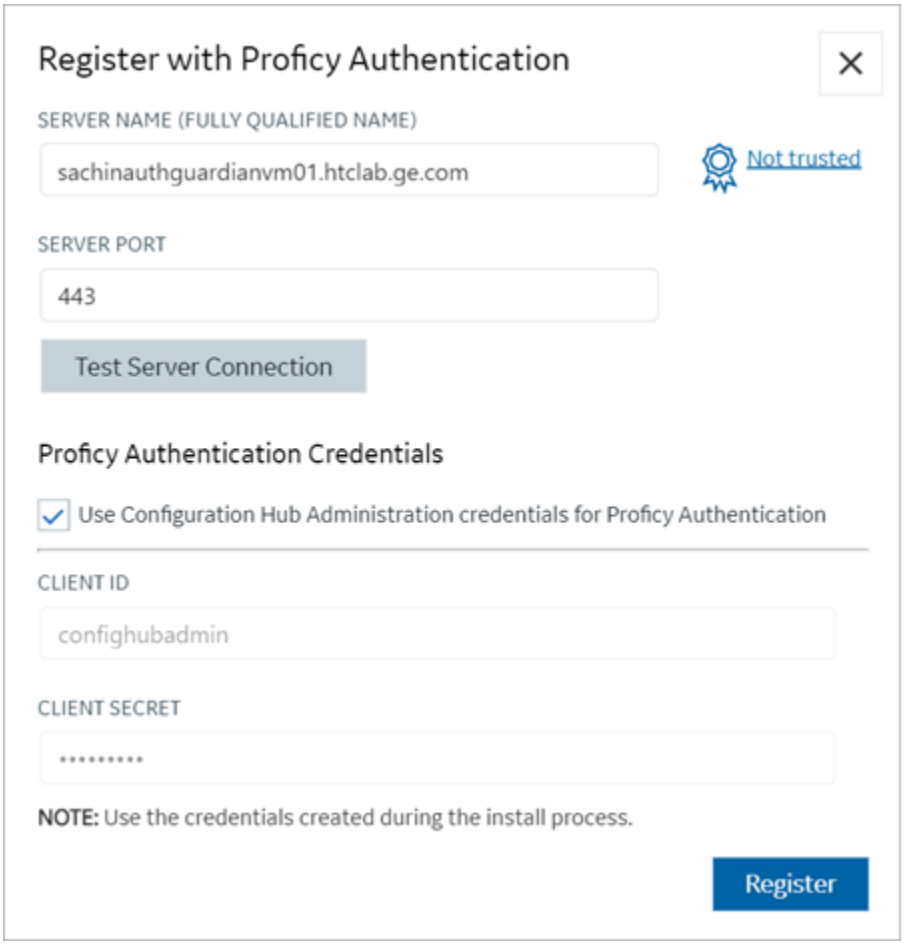
Field	Description
Client ID	The client ID provided during installing Configuration Hub. Example: `confighubadmin`
Client Secret	The client secret provided during installing Configuration Hub.



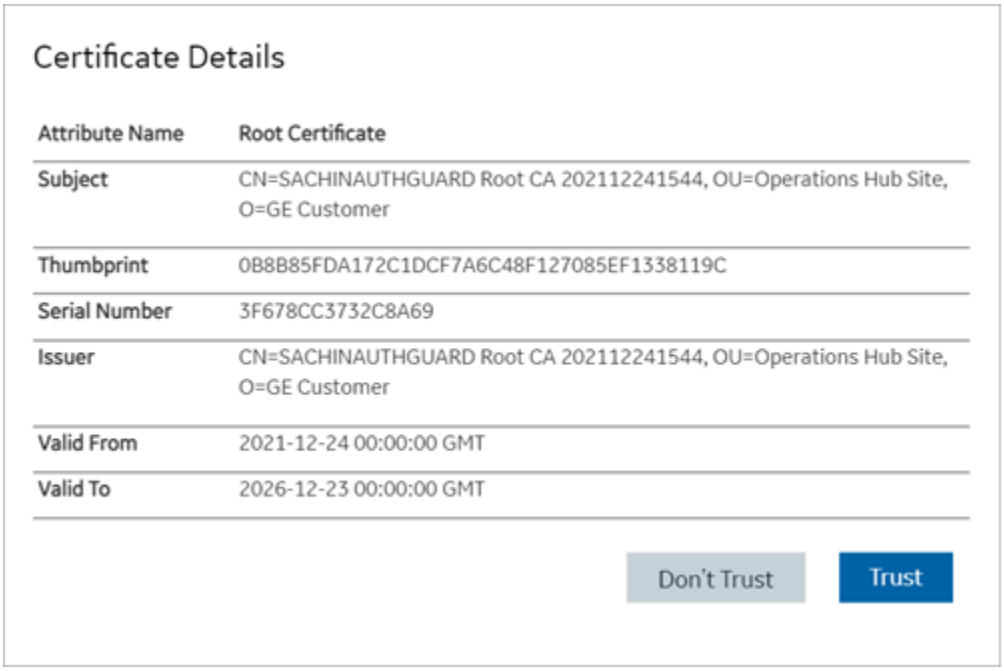
4. Select **Verify**.
   If the credentials are correct, the **Register with Proficy Authentication** screen appears.

5. Provide these details to configure the Proficy Authentication application.
   These fields are populated automatically if you opted for installing Proficy Authentication along with Configuration Hub. You have the option to edit and update the details.

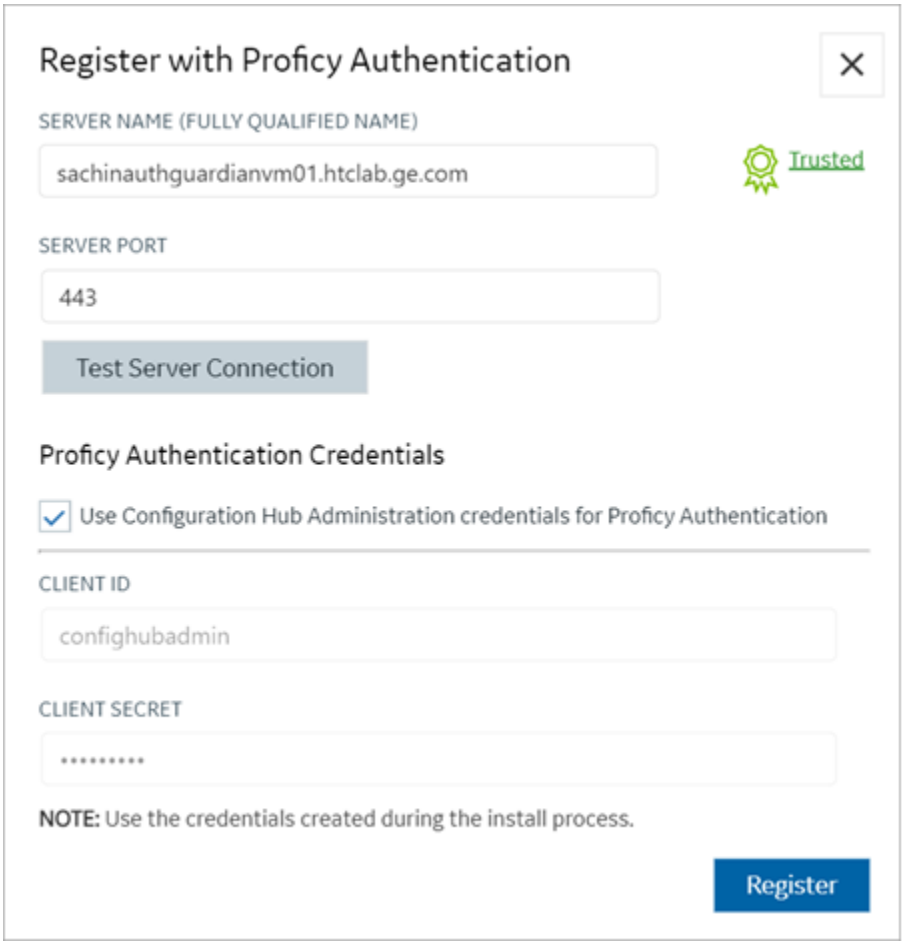
Field	Description
Server Name (Fully Qualified Name)	The host name of the machine where Proficy Authentication is installed. Enter a fully qualified domain name. For example, `desktop-sahfg5f.logon-.ds.ge.com` Refer to step 6 to establish a trust with this server connection.
Server Port	The port number to communicate with the host machine. The default port where UAA is installed is `443`. The server connection is automatically tested on entering the port. You can also select **Test** to test the connection.
Use Configuration Hub Administration credentials for Proficy Authentication	Select this check box to populate the same login credentials you entered for Configuration Hub Admin account. If you want to use unique login credentials for Proficy Authentication, clear the check box and enter **CLIENT ID** and **CLIENT SECRET**.
Client ID	The administrator client identifier that has permission (authority) to log in to Proficy Authentication.
Client Secret	The administrator client secret to log in to Proficy Authentication.



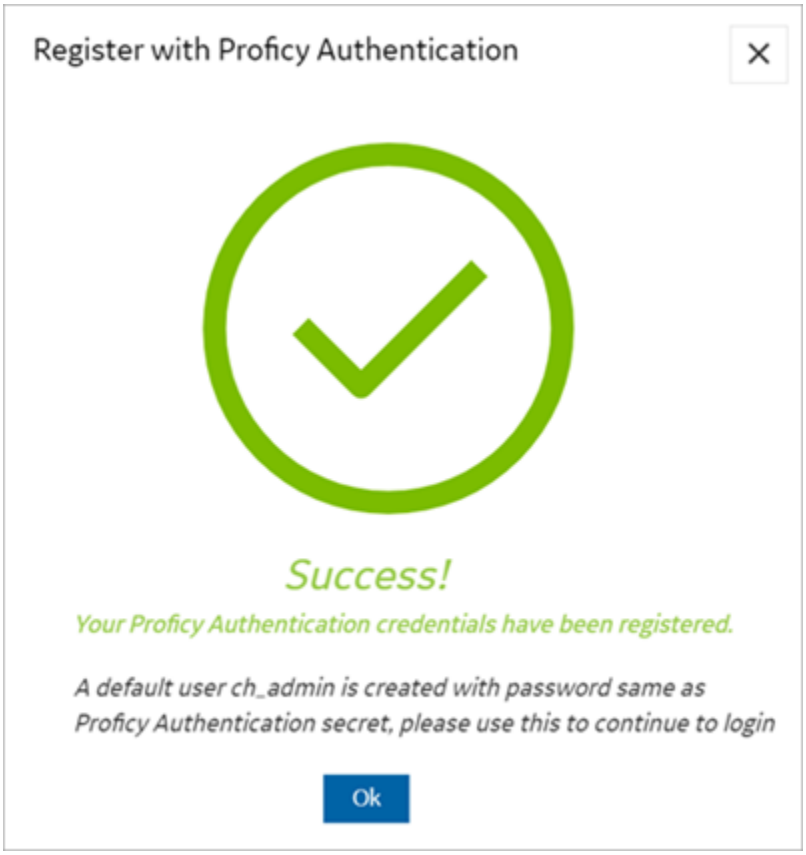
6. Select **Not trusted** to establish a trust connection between Configuration Hub and Proficy Authentication.
   The **Certificate Details** screen appears.



7. Select **Trust**.
   The trusted certificate(s) are added to the windows store on the machine where Configuration Hub is installed.



8. Select **Register**.



9. Select **Ok**.
   The **Configuration Hub Login** screen appears.

Configuration Hub is set up as a client for Proficy Authentication. The following default user is created to log in to the Configuration Hub application.

User ID	Password
`ch_admin`	The client secret you entered for Proficy Authentication.

Log in to Configuration Hub and perform operations related to Proficy Authentication.

Get Started With Proficy Authentication

This topic helps you to get started with the application.

Proficy Authentication provides identity-based security for Proficy based applications and APIs.

You can perform the following tasks in Proficy Authentication:

- Configure UAA/LDAP *(on page 146)*/SAML *(on page 155)* identity providers
- Create new user accounts *(on page 198)*
- Create new group accounts *(on page 189)* and add users/other groups as members
- Perform UAA/LDAP/SAML group mapping *(on page 192)*

Task Roadmap

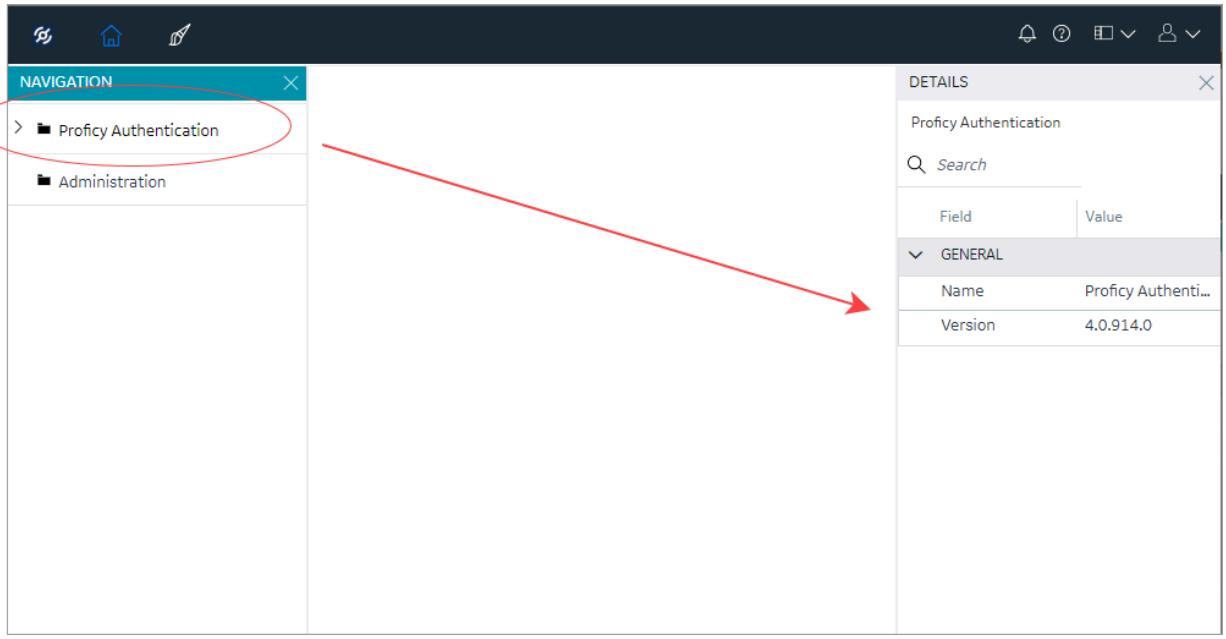
The roadmap is designed to guide you through a sequence of task workflows within Proficy Authentication.

#	Task	Description
1	Install and set up Proficy Authentication.	Set up Proficy Authentication *(on page 135)*
2	Enhance security by implementing multi-factor authentication.	Enable Multi-Factor Authentication *(on page 179)*
3	(Optional) For seamless user experience, consider implementing auto-login. But make sure that your system operates within a trusted network to reduce the risk of unauthorized access.	Windows Integrated Authentication / Auto-login *(on page 204)*
4	(Optional) For continuous, reliable, and scalable access to authentication and authorization systems, consider implementing high availability.	Configure High Availability for Proficy Authentication *(on page 220)*
5	Define scopes and permissions to control access to resources.	Overview of Managing Groups in Proficy Authentication *(on page 183)*
6	Develop a backup and recovery plan to ensure data integrity and availability.	Backup and Restore *(on page 250)*

Check Installed Version

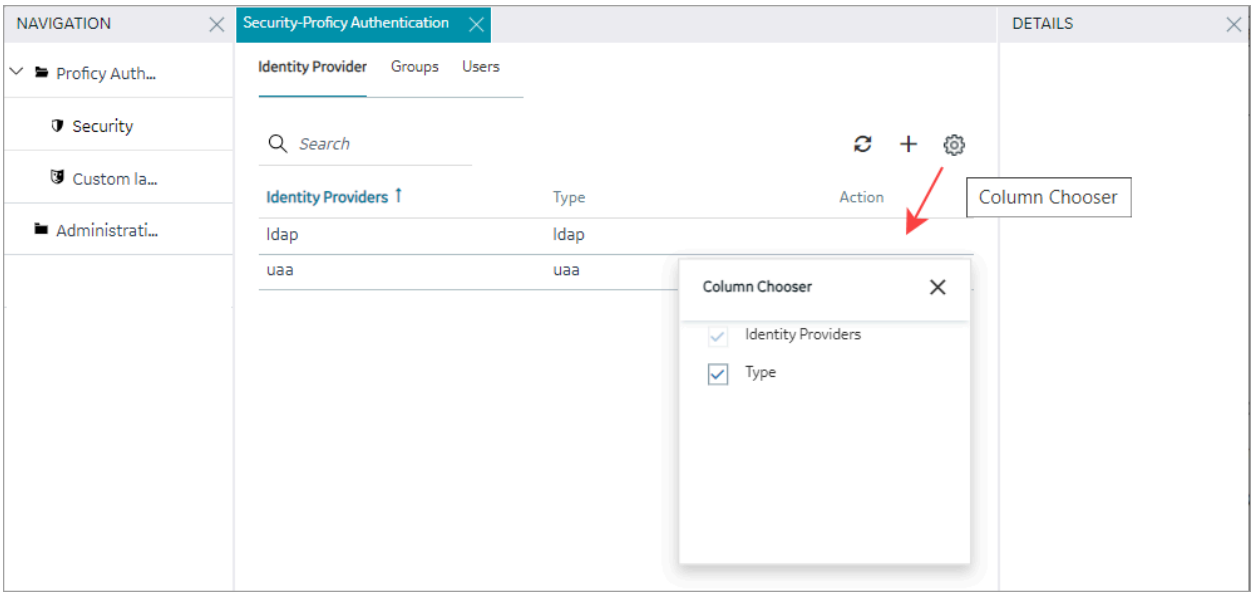
To check the version of the Proficy Authentication application within Configuration Hub, select the application name on the **NAVIGATION** menu. The version information appears under **DETAILS**.

The following screenshot shows Proficy Authentication 2024 installed, highlighting its specific build version.



Show or Hide Data Columns

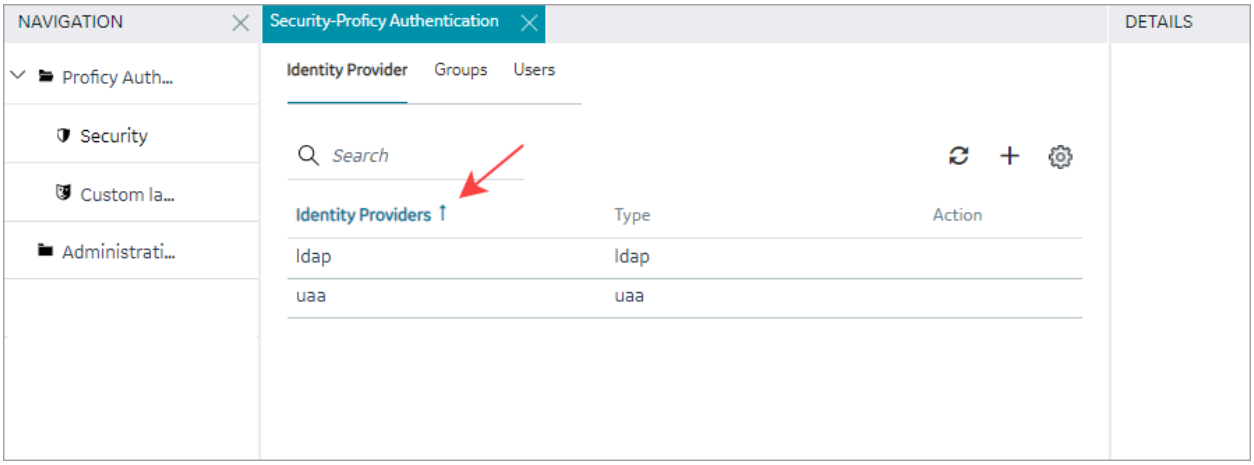
Customize the display of data by choosing which columns to display and which to hide. You can show or hide columns based on your needs, making it easier to focus on relevant information and de-clutter the display.



1. Select  for the respective data. The **Column Chooser** dialog appears with a list of available columns.
2. Select the check box for the column you want to show. To hide a column, clear its check box.
3. Close the dialog to apply the changes.

Sort by Columns

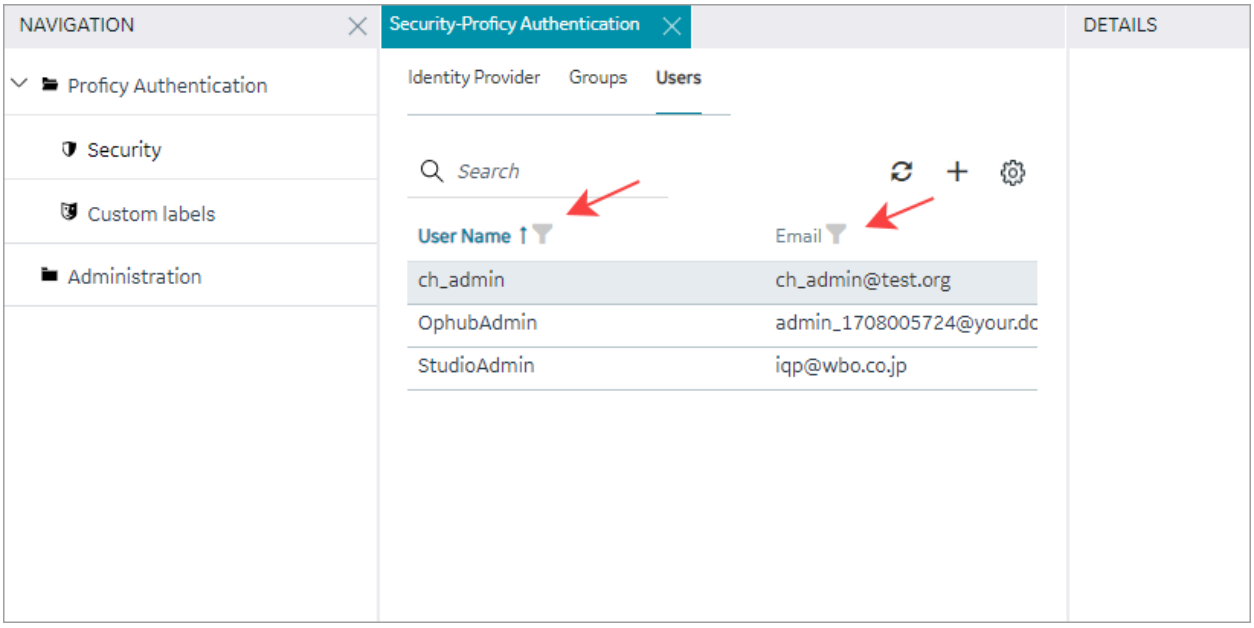
Use the sorting option to sort data in columns by ascending or descending order. When dealing with large datasets, it is easier to analyze, compare, and understand the information when the data is organized in a meaningful way. The sorting option appears when you select a data column.



- Select  to sort data in an ascending order.
- Select  to sort data in a descending order.

Filter by Columns

Use the filter option to narrow down a dataset and focus on specific information. The filtering option appears next to each data column.

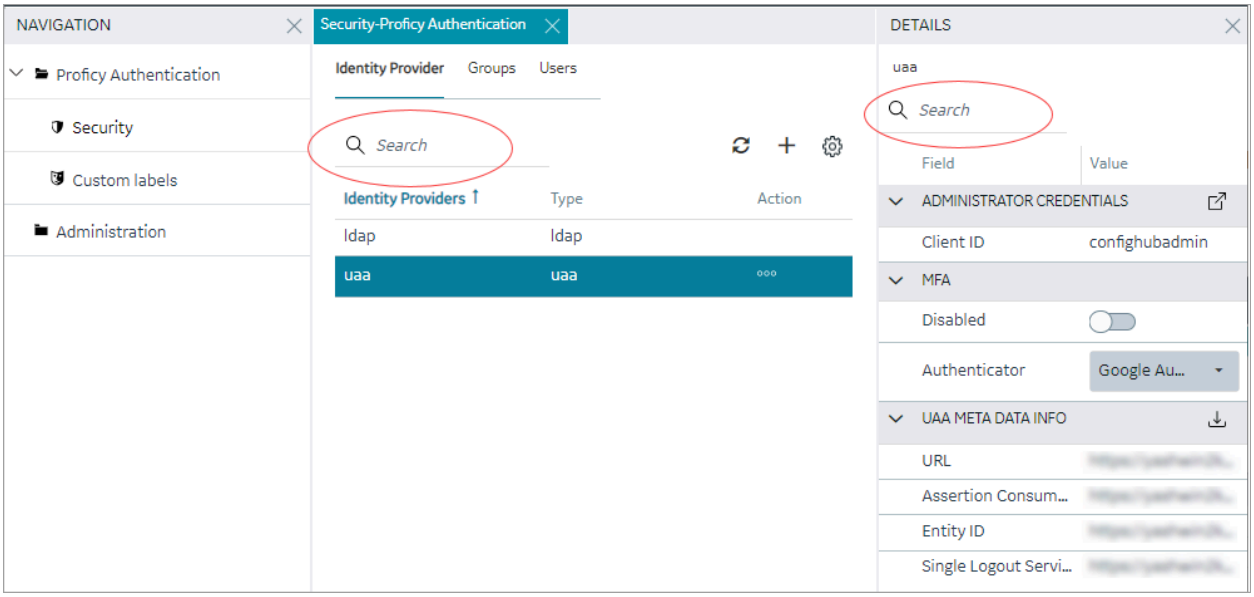


1. Select the filter icon for the data you want to filter. A screen appears with a list of existing data in that column.
2. Select the check box for the data you want to filter.

   To undo filtering, you can **Select All**.
3. Select **OK** to apply.

Search with Keywords

Use the search option to search within a dataset using keywords or specific terms that match with the existing accounts in Proficy Authentication. You can also filter account details using search keywords.



Manage Identity Providers

LDAP

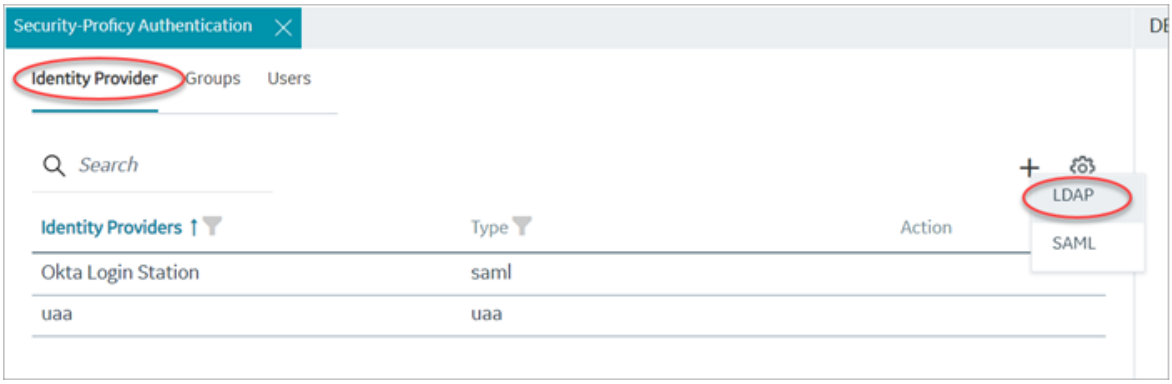
Add LDAP Identity Provider

This topic describes how to add a LDAP account in Proficy Authentication.

Log in to Configuration Hub with user/client having write access for admin and clients.

You can add multiple LDAP connections.

1. Go to **Proficy Authentication > Security > Identity Provider**.
2. Select + and then select **LDAP**.

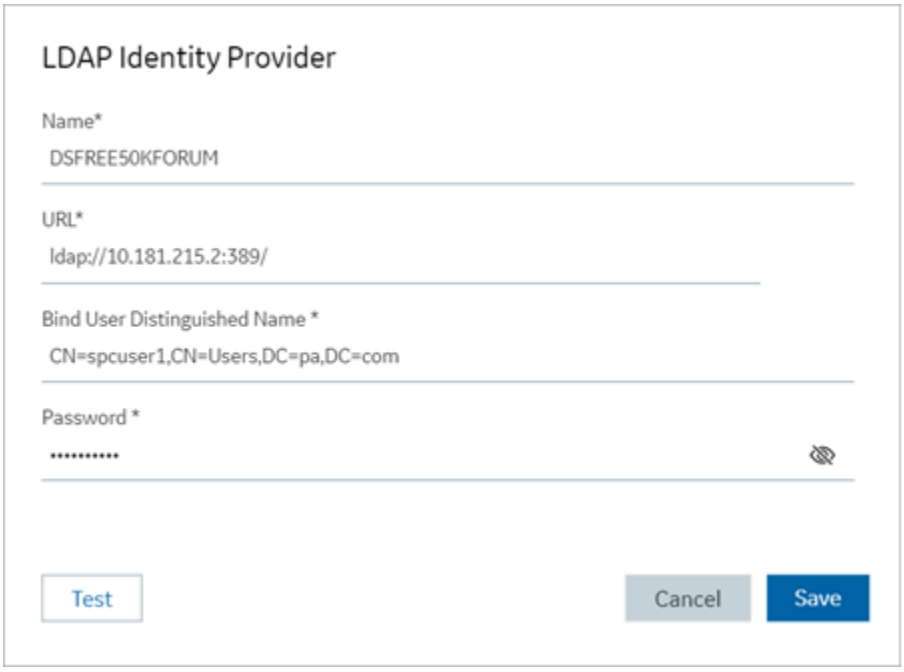


The **LDAP Identity Provider** screen appears.

3. Enter the following details:

Field	Description
Name	A unique name to help identify your LDAP connection.
URL	The URL of the LDAP server. The trailing slash (/) must be included at the end of the URL. You can use LDAP with or without secure authentication in the following format: ◦ Insecure port: `ldap://100.100.100.2:389/` ◦ Secure port: `ldaps://100.100.100.2:636/` **Important:** In a URL address, ensure that `ldap` is in lowercase. Using uppercase letters will render the address non-functional. You can also use a fully qualified domain name instead of an IP address. For a secure port, provide user credentials.
Bind User Distinguished Name	This is a distinguished LDAP user name to represent various entities within an LDAP directory hierarchy, including users, groups, and organizational units. The canonical format consists of CN (Common Name), DC (Domain Component), and OU (Organization Unit Name). CN and DC are mandatory, while OU is optional. Enter the LDAP Distinguished Name in compliance with LDAP standards to ensure proper processing by the system. In the following example, each component (CN, OU, DC) is correctly formatted, separated by commas without any spaces, and is case sensitive. `CN=John Smith,OU=Factory,DC=Company,DC=COM` Play the video: ***How to retrieve the User Distinguished Name required for establishing or modifying the LDAP connection*** video/LDAP_UserDistinguishedName.mp4

Field	Description
Password	The password to log in to the LDAP server if you choose secure authentication.
Test	Tests the connection to the LDAP server. If the URL and login details are correct, you will receive a test successful message.
Skip SSL Verification	This option appears only when you choose a secure port for LDAP. Select this check box if you want to skip establishing a secure connection between client and server for exchanging LDAP data. Clear the check box to allow SSL verification. Refer to step 4.

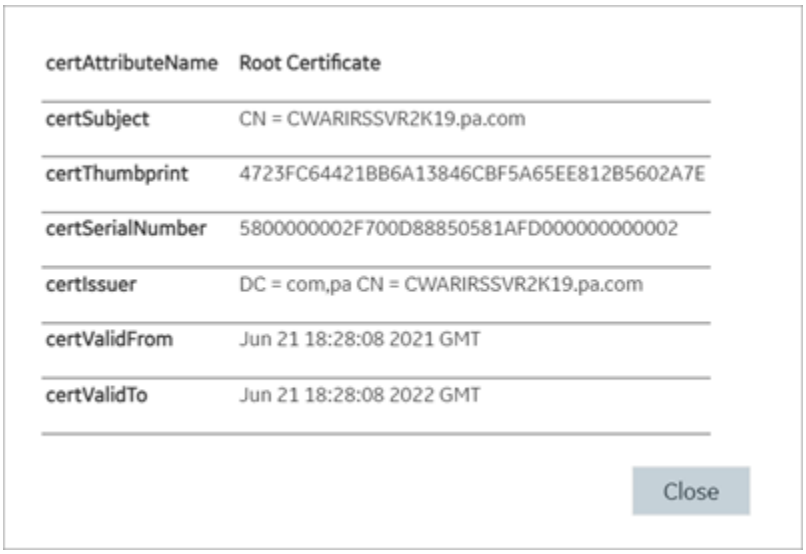


4. If you choose to secure LDAP, select for SSL verification.
   A message appears when the security certificate is trusted and added to the store.

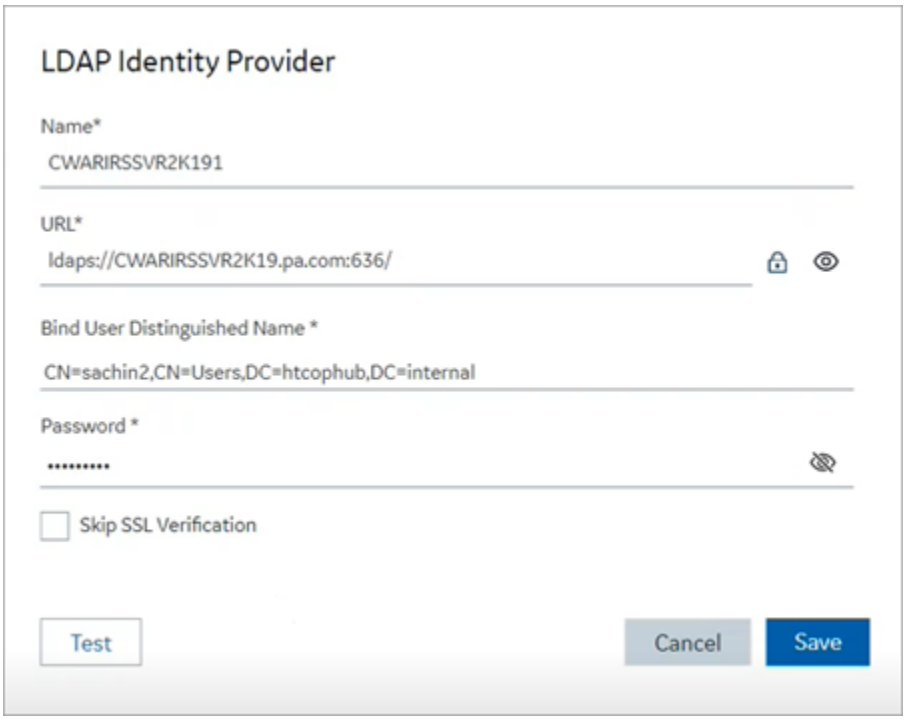
   In case the certificate is not added automatically, the following message appears.

Select **Browse** to navigate and choose the server certificate from your local system.

5. **Optional:** Select next to the lock icon to view the certificate.



6. Select **Save**.

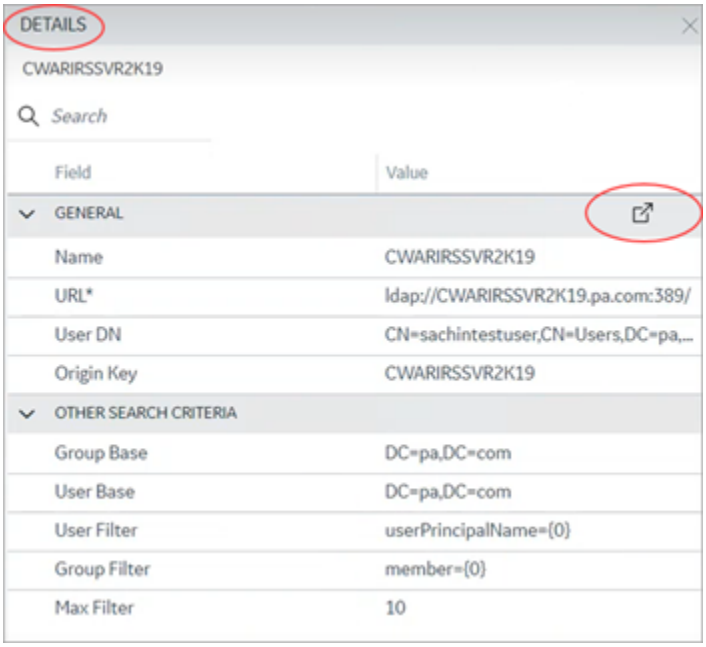


Modify LDAP Identity Provider

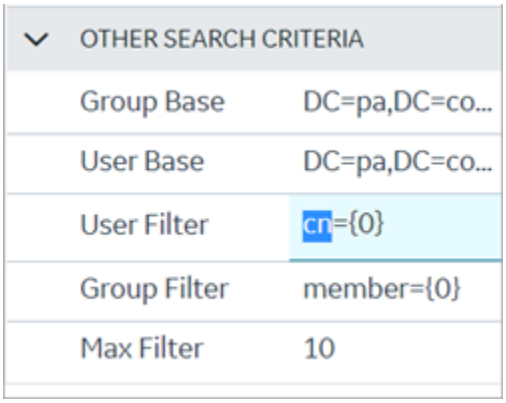
This topic describes how to modify the existing details for the LDAP account.

Add LDAP Identity Provider *(on page 146)*

1. Log in to Configuration Hub as an administrator.
2. Go to **Proficy Authentication > Security > Identity Provider**.
   The existing list of identity providers appear.
3. Select the LDAP identity provider.
   The existing information for the identity provider appears on the **DETAILS** panel.
4. To modify the **GENERAL** details, select  to open a pop-up screen with the existing information.



5. If you modify any existing information, save the changes.
   The general details are required to configure LDAP authentication.
6. To modify **OTHER SEARCH CRITERIA** details, place your cursor and enter the new value for the respective criteria.



Use these settings to enable the sub-directories in your search criteria.

Search Criteria	Example Value	Description
Group Base	`OU=Sales,OU=Groups,OU=Enterprise,DC=company,DC=com`	Defines the starting point for the LDAP group search in the active directory tree.

Search Criteria	Example Value	Description
		◦ **CN** is Common Name (required) ◦ **DC** is Domain Component (required) ◦ **OU** is Organization Unit Name (optional) **Note:** If you use only `DC=Ge,DC=com`, timeout may occur due to slow system response. Use the exact `OU` to avoid timeout. See Optimizing LDAP Directory Search *(on page 153)*
User Base	`OU=Sales,OU=Users,OU=Enterprise,DC=company,DC=com`	Defines the starting point for the LDAP group user search in the active directory tree. **Note:** If you use only `DC=Ge,DC=com`, timeout may occur due to slow system response. Use the exact `OU` to avoid timeout. See Optimizing LDAP Directory Search *(on page 153)*
User Filter	`userPrincipalName={0}`	Allows the LDAP user (active directory user) to login into Configuration Hub with their email address.
User Filter	`cn={0}`	Allows the LDAP user (active directory user) to login with their display name. This is field is populated by default.
User Filter	`sAMAccountName={0}`	Allows the LDAP user (active directory user) to login with their account name (Windows login name). This is field is populated by default.

Search Criteria	Example Value	Description
Group Filter	`member={0}`	Retrieves the `memberOf` attribute values for the specific user. This is field is populated by default.
Max Filter	`10`	Defines the maximum depth for searching the LDAP groups. The default value is `10`. For very large systems, set the value to `2` as it may impact system performance.

Optimizing LDAP Directory Search

This topic describes how to efficiently perform searches for objects (such as users and user groups) in an Active Directory service.

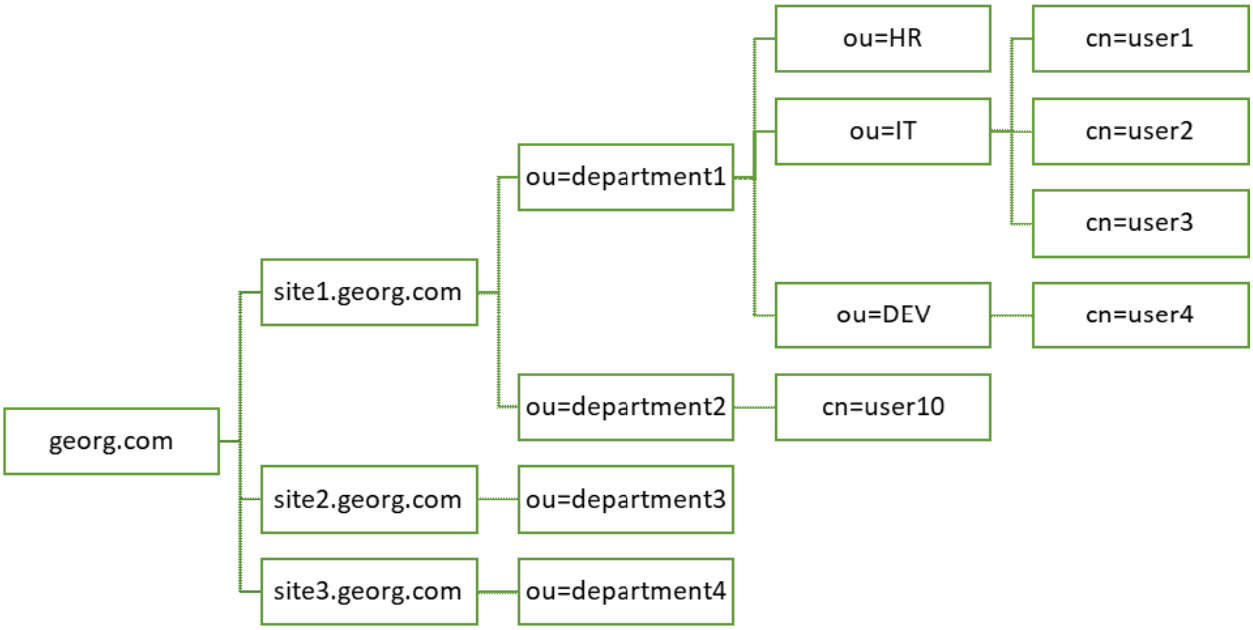
In Active Directory, resources are organized into structures called classes.

Classes are logical groupings of objects such as:

- User accounts
- User groups
- Computers
- Domains
- Organizational units

Some objects, referred to as 'containers', can hold other objects. For example, an organizational unit is a container object. Therefore, the organization of objects in Active Directory follows a hierarchical structure.

The following illustration depicts a hierarchical arrangement of a tree with three domains, each having its own set of organizational units (OUs) for users and groups.



User Search Base and Group Search Base

The User Search Base and Group Search Base set the scope for searching the respective objects in Active Directory's hierarchical structure. Therefore, it is recommended to select values in such a way that they are specific enough to reduce the scope of the search only to the intended area in the tree structure, while ensuring no intended User or Group is missed within the search scope.

Maximum Search Depth

The `Max Filter` parameter determines the maximum depth or level applied when searching the Active Directory hierarchy. This value specifies the number of recursive levels at which the search for contained Group objects is performed for each Group object encountered while searching in Active Directory's hierarchy structure.

Example: Consider a containment hierarchy consisting of a nested structure of user groups (UG1 to UG4) in a hierarchical format, wherein:

- UG1 contains UG2
- UG2 contains UG3
- UG3 contains UG4

```
UG1
    └ UG2
```

```
    └ UG3
        └ UG4
```

If the logged-in user has direct group membership in UG4, and:

if `Max Filter` is set to 4	then, the search for the user's group membership returns all groups in the hierarchy, including UG1, UG2, UG3, and UG4.
if `Max Filter` is set to 3 (or less)	then, the user's group membership returns only UG2, UG3, and UG4. It does not go beyond the third level in the hierarchy.
if `Max Filter` is set to 10	then, the search returns all groups (UG1 to UG4) as specified, but it involves unnecessary recursive calls (10 in total, out of which 6 are unnecessary). This can impact performance.

In summary:

1. The default value for `Max Filter` is 10.
2. It is recommended to choose a value aligned with the maximum nested level in your Active Directory's Group hierarchy to avoid unnecessary recursive calls and performance issues.
3. Typically, customers choose values like '1' or '2' based on common nested level/depth of User Groups in most scenarios. However, the choice ultimately depends on your specific requirements.

Tip:
You can use third-party tools like Softerra LDAP Browser or AD Explorer to check connectivity to the LDAP server. You can also explore the organizational hierarchy and locate specific Users and Groups within the directory.

SAML

Enable SAML

This topic describes how to configure SAML identity providers for Proficy Authentication.

You should enable SAML prior to adding SAML IDP accounts *(on page 177)* in Proficy Authentication.
To enable SAML, you will need to download the Proficy Authentication service provider's metadata file.

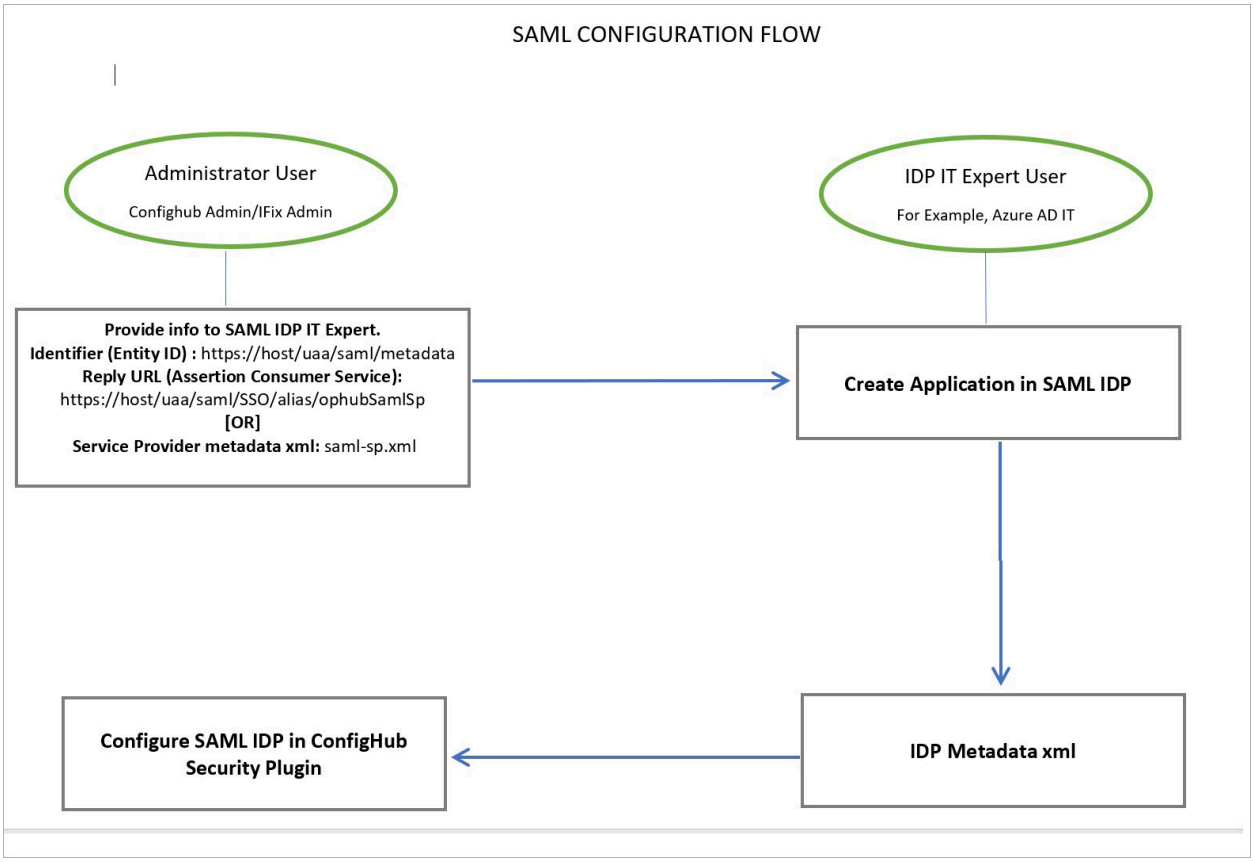
1. Visit `https://enter FQDN of the machine where Proficy Authentication is installed/uaa/saml/metadata` to download the `saml-sp.xml` file.
2. To configure any SAML identity provider, gather information from the downloaded `saml-sp.xml` file.
3. Generate a metadata XML file from the configured identity providers, and use the file to add a SAML IDP account *(on page 177)* in Proficy Authentication.

Refer to the following examples on how to set up SAML identity providers for Proficy Authentication:

- Configure Okta as SAML IDP *(on page 157)*
- Configure Azure AD as SAML IDP *(on page 163)*

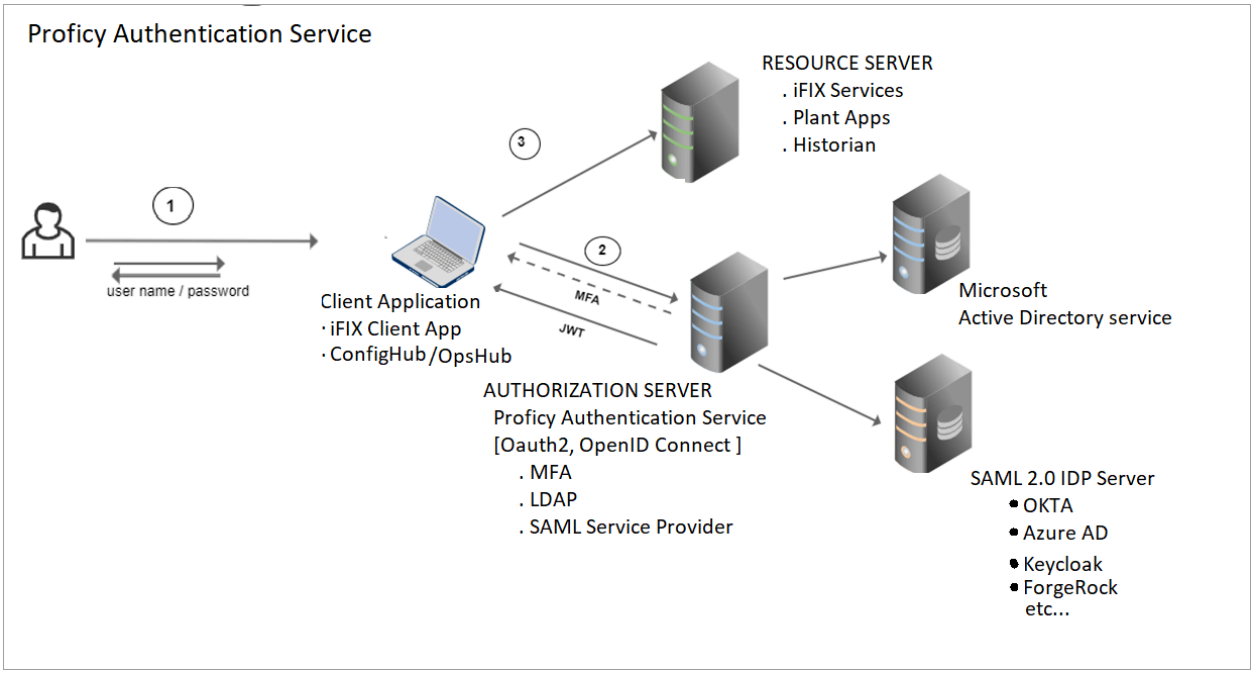
SAML Configuration Flow

The following diagram is a visual representation of the key components involved in the SAML configuration flow.



In the SAML configuration flow, Proficy Authentication Service acts as a SAML Identity Provider (IDP). You must configure Proficy Authentication Service as an IDP by providing it with the necessary SAML metadata and settings.

The following figure illustrates how the data flows and interacts to ensure secure access to resources.



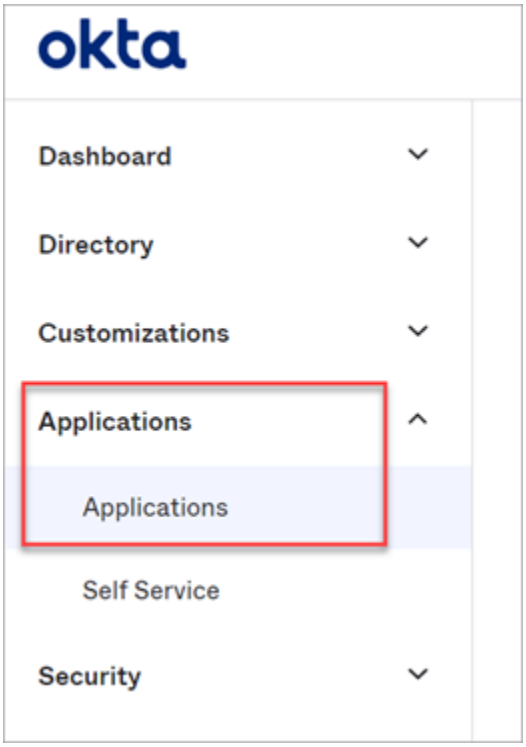
1. Users provide their credentials, which includes a user name and password.
2. When users attempt to access a protected application, they are redirected to the Proficy Authentication Service for authentication.

   Proficy Authentication Service generates a SAML authentication request and sends it to the user's browser. This request is sent to the configured IdP endpoint.
3. If users are successfully authenticated, they gain access without the need to log in separately.

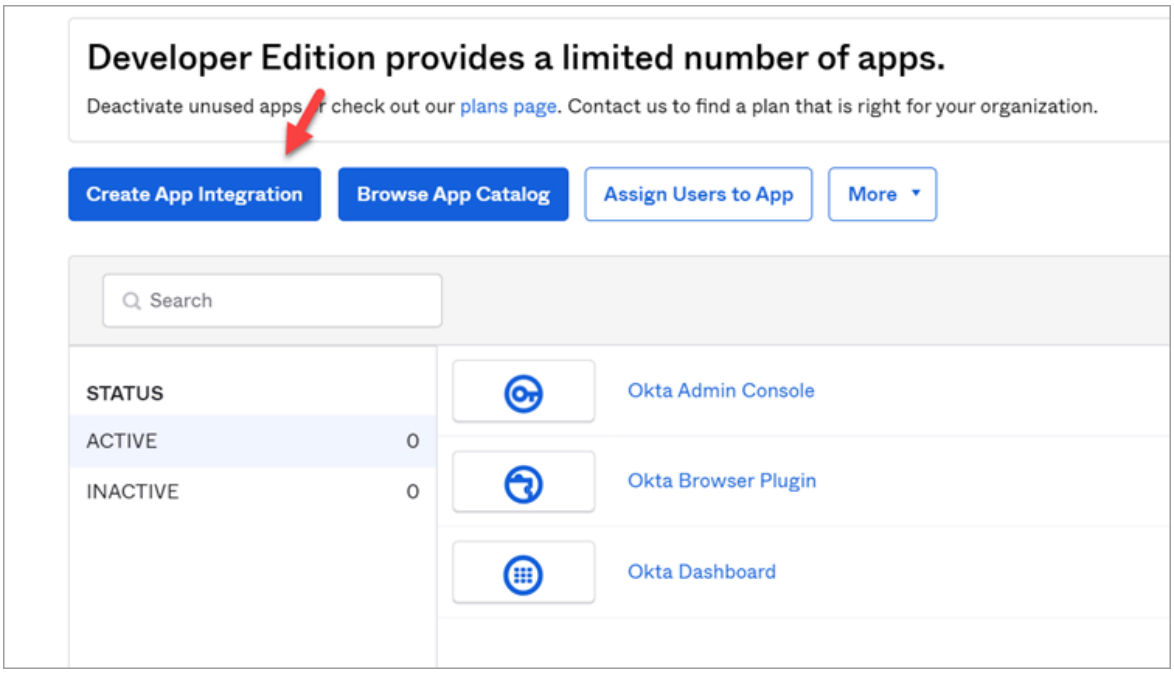
Configure Okta as SAML IDP

This topic describes SAML configuration with Okta.

1. Create an account in Okta.
   a. Visit https://developer.okta.com/.
   b. Sign up for an Okta account using your email address.
2. Log in to your newly created Okta account.
3. Navigate to **Applications > Applications**.

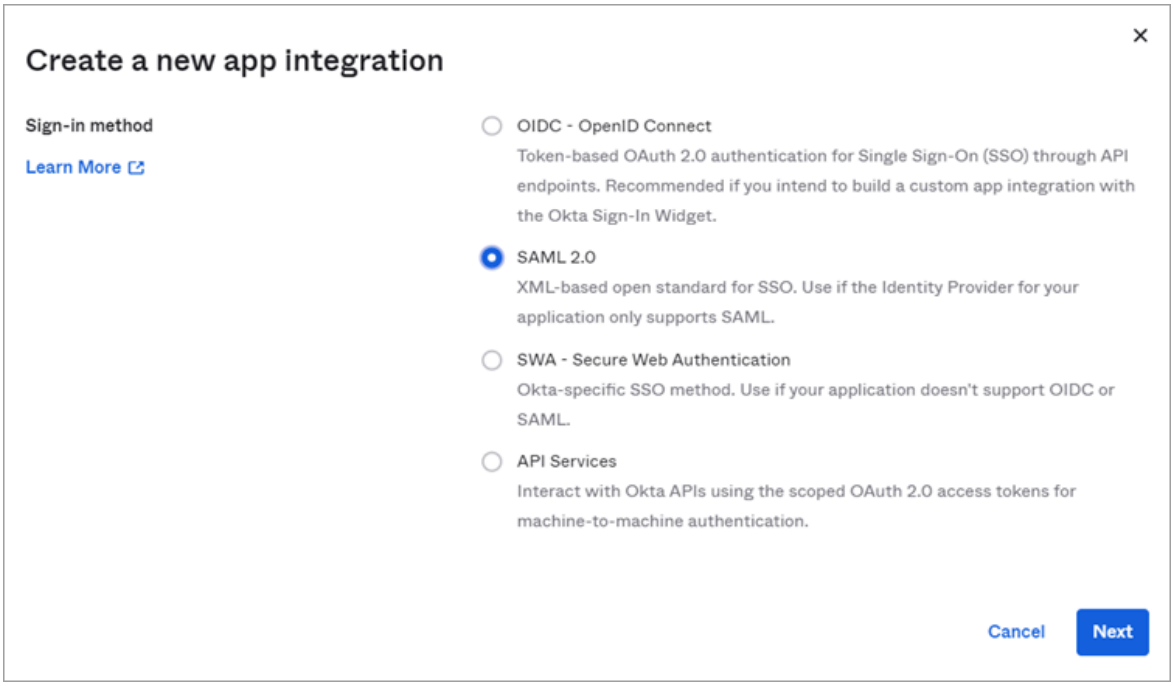


4. Select **Create App Integration**.



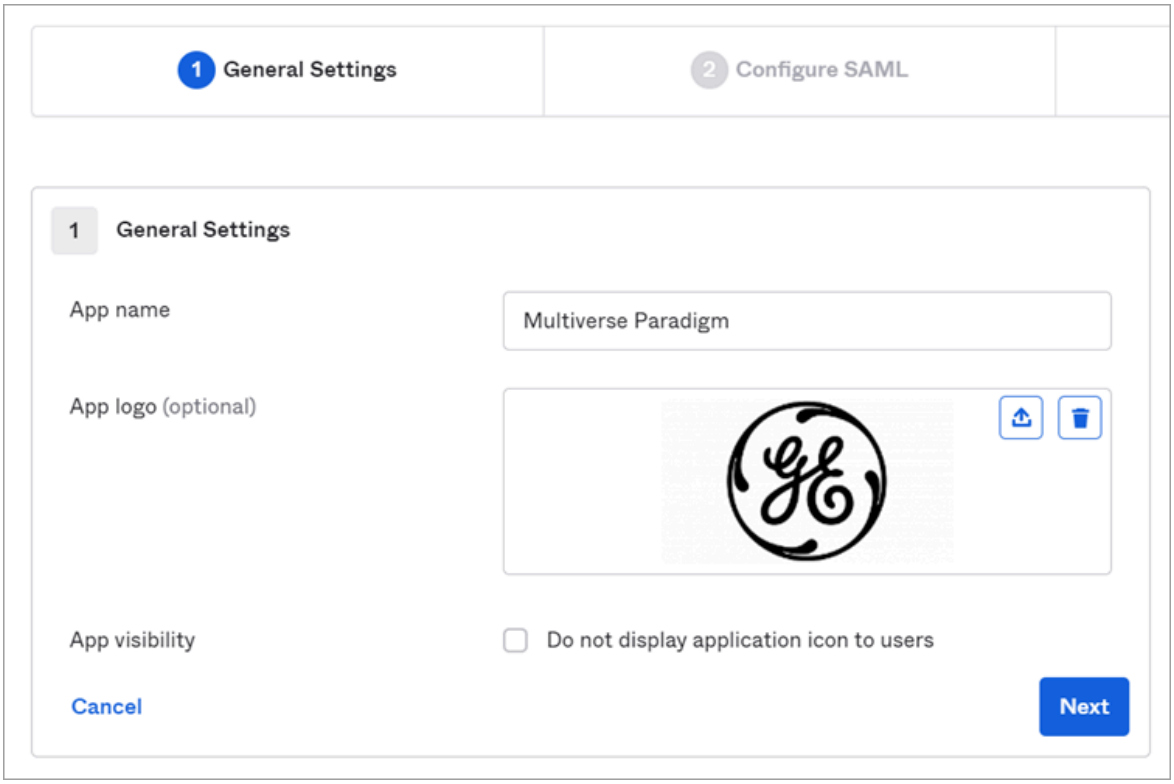
The **Create a new app Integration** screen appears.

5. Select **SAML 2.0**, then select **Next**.

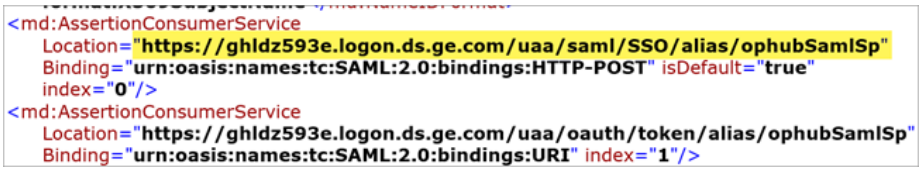
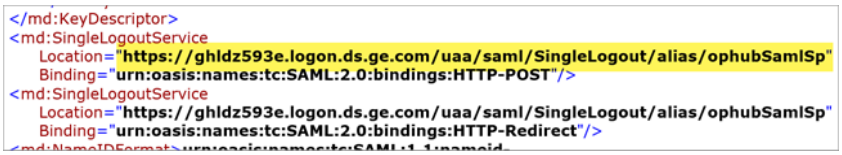


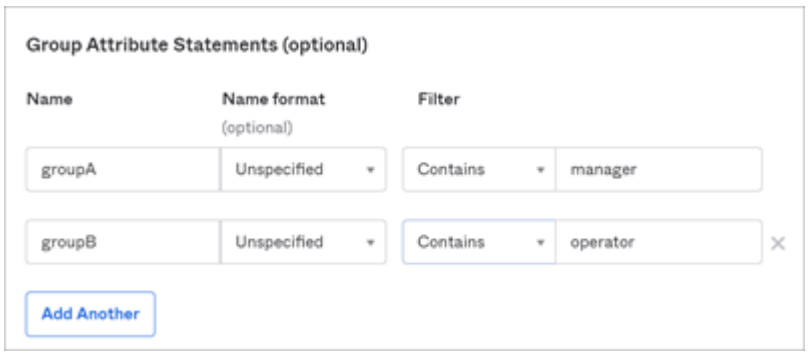
The **Create SAML Integration** screen appears.

6. Under **General Settings**, provide a name and logo for your application, then select **Next**.



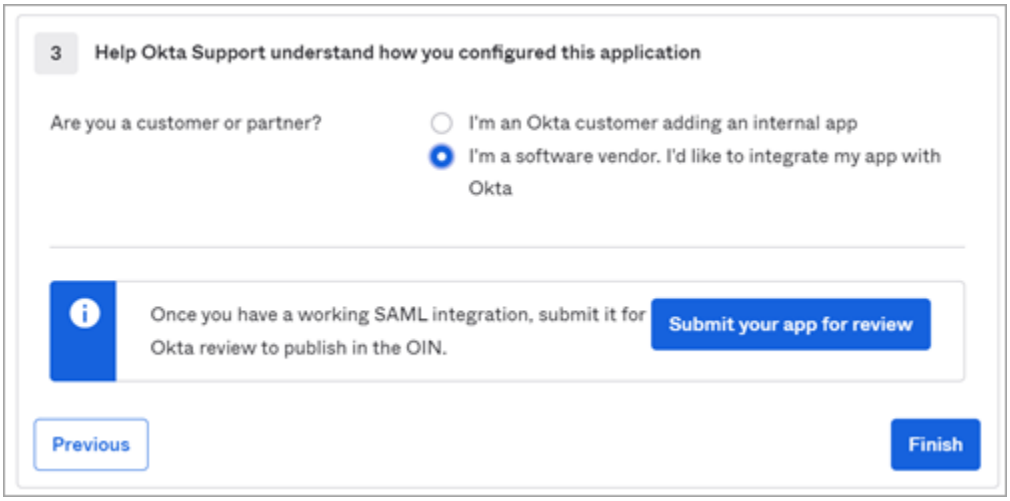
7. Under **Configure SAML**, fill out these details:

Single sign on URL	Use the dowloaded Proficy Authentication metadata file *(on page 155)* `saml-sp.xml` to get the URL for this field. It should look something like this: 
Audience URI (SP Entity ID)	Refer to `saml-sp.xml` to get the logout URL. It should look something like this: 
Enable Single Logout	a. Select **Show Advanced Settings**. b. Select the check box for **Allow application to initiate Single Logout**. c. Enter **Single Logout URL**. Refer to `saml-sp.xml` to get the logout URL. It should look something like this: 
Attribute Statements (optional)	Add user attribute statements such as email, first name, and last name as shown here: 
Group Attribute Statements (optional)	Add group attribute statements such as groupA and groupB as shown here:



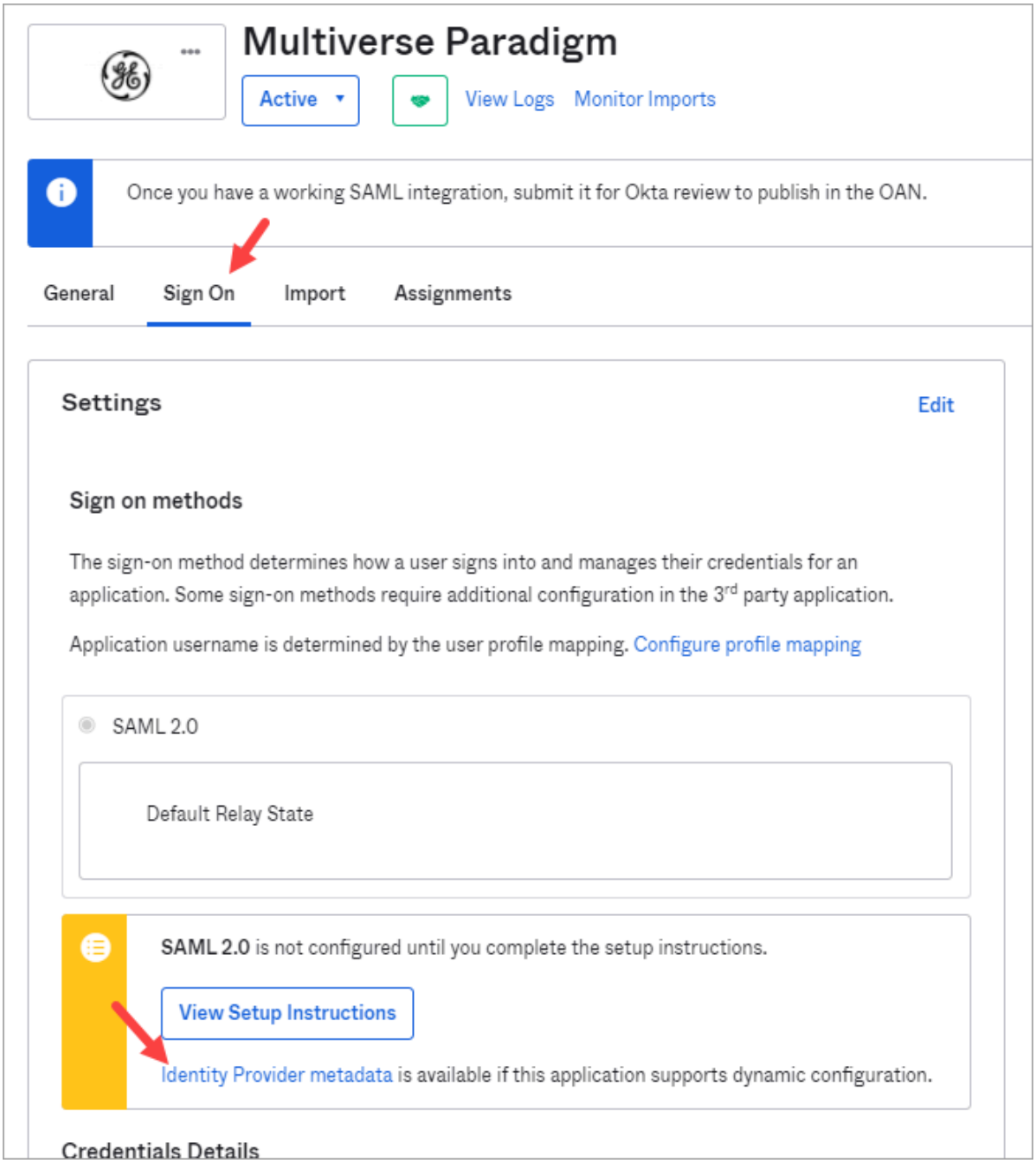
Note:
The setting option mentioned in this topic is the minimum requirement for setting up the SAML identity provider. Refer to the Okta documentation for information on using additional settings.

8. Select **Next**.
9. Provide your feedback and select **Finish**.



Your application is created.

10. Under **Sign On**, select **Identity Provider metadata**.



The metadata opens in a new tab.

11. Save the metadata as an .xml file.
    Use the metadata xml file to configure a SAML identity provider *(on page 177)* in Proficy Authentication.
12. Under **Assignments**, you can assign the app to groups and individual users.
    If there are no users/groups, navigate to **Directory > People** to create and activate new users/groups in Okta.

Configure Azure AD as SAML IDP

This topic describes how to configure Azure AD (Active Directory) as a SAML identity provider.

To configure SAML as an authentication scheme for single sign-on, you must have the following:

Pre-requisite	Description
Create Your Azure Account	If you don't already have an Azure account, you should create one to proceed with the SAML configuration. Visit https://azure.microsoft.com/en-us/free/ to sign up for a free account. Make sure your account has sufficient privileges to perform the SAML configuration.
Set Up Your Enterprise Application	Do the following to set up an enterprise application in Azure with the necessary configuration. 1. Log in to your Azure account. 2. Refer to the steps described in Microsoft Azure documentation on how to create a new enterprise application. In the steps that follow, we shall refer to an example enterprise application called `bobtestsaml`.
Associate Users and Groups	For the SAML setup to work, you have to associate at least one user and one group with the enterprise application. This is important for the authentication process. 1. Log in to your Azure account and navigate to the enterprise application you created earlier (`bobtestsaml` is our example application). 2. Select **Users and groups > Add user/group**. 3. Search and assign the user/group to the application.

In the steps that follow, we shall accomplish the following:

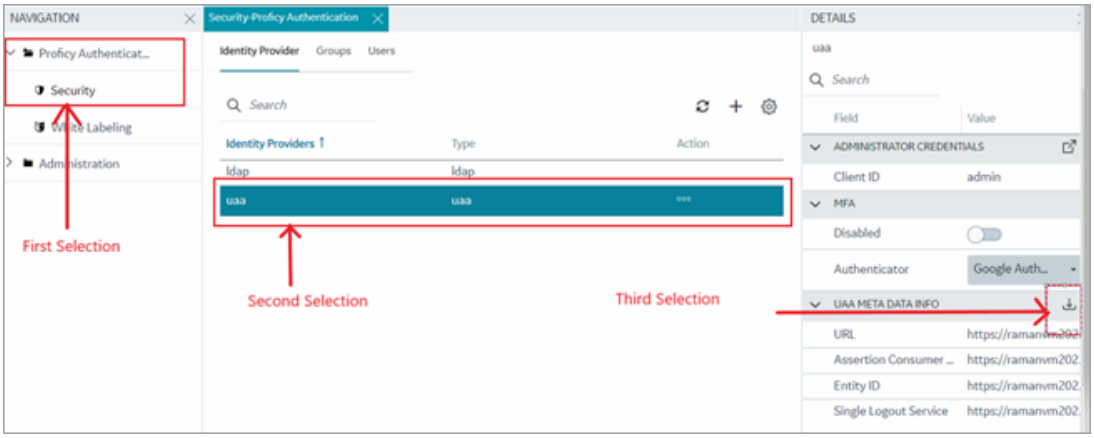
- Create a SAML App in Azure (performed by your skilled IT Azure Expert).
  - Download the SAML Metadata file *(on page 164)*
  - Upload the saml-sp.xml File to Azure AD *(on page 164)*
  - Perform User and Group Attribute Mapping in Azure *(on page 167)*
- Configure Azure Metadata XML in Proficy Authentication. (performed by the Application Administrator.)
  - Create SAML Connection in Proficy Authentication *(on page 170)*
  - Adding and Mapping UAA and SAML Groups *(on page 173)*
  - Test SAML Authentication *(on page 175)*

See also, Troubleshooting *(on page 175)*.

1. **Download the SAML Metadata file**

   a. Log in to Configuration Hub.
   Use valid credentials, preferably the default `clientID`.

   b. Navigate to **Proficy Authentication > Security > Identity Provider** and download the UAA `saml-sp.xml` metadata file.



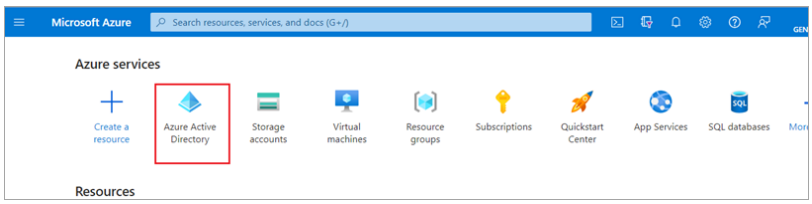
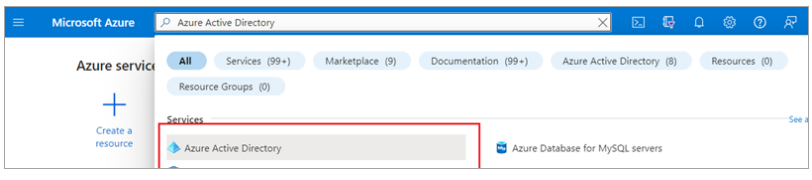
   The metadata file is downloaded to your browser's Download section.

2. **Upload the saml-sp.xml File to Azure AD**

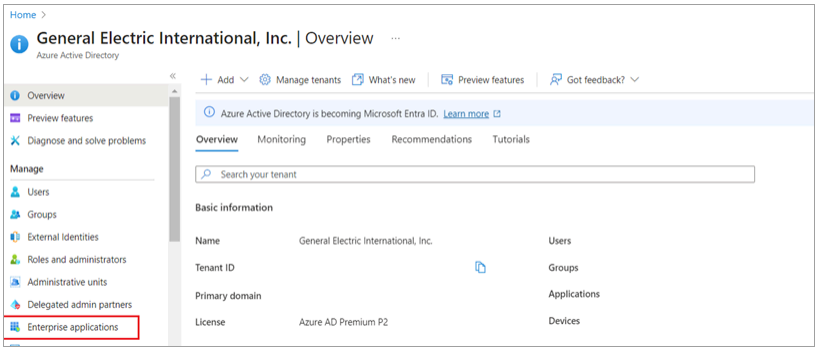
   a. Visit https://portal.azure.com and login with your valid credentials.

   b. After logging in, select **Azure Active Directory**.

> **Tip:**
> You can find it under recent services, or by using the search option.

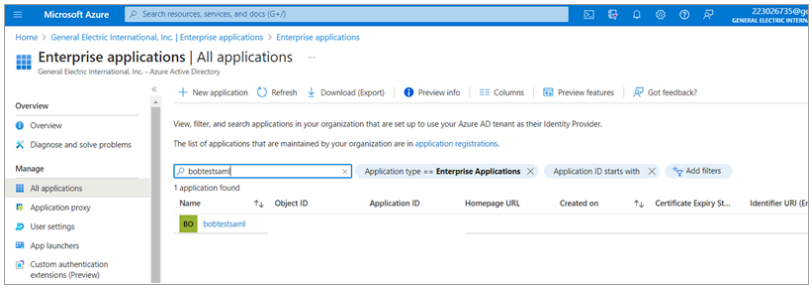
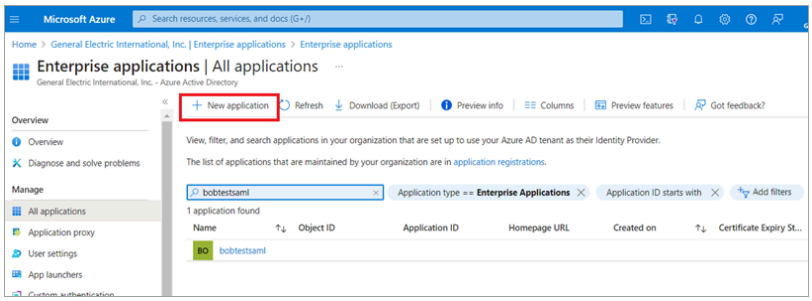
Under recent services:	
Run a search using the search bar:	

c. Under Azure Active Directory, locate the enterprise application to which you want to establish a SAML connection.

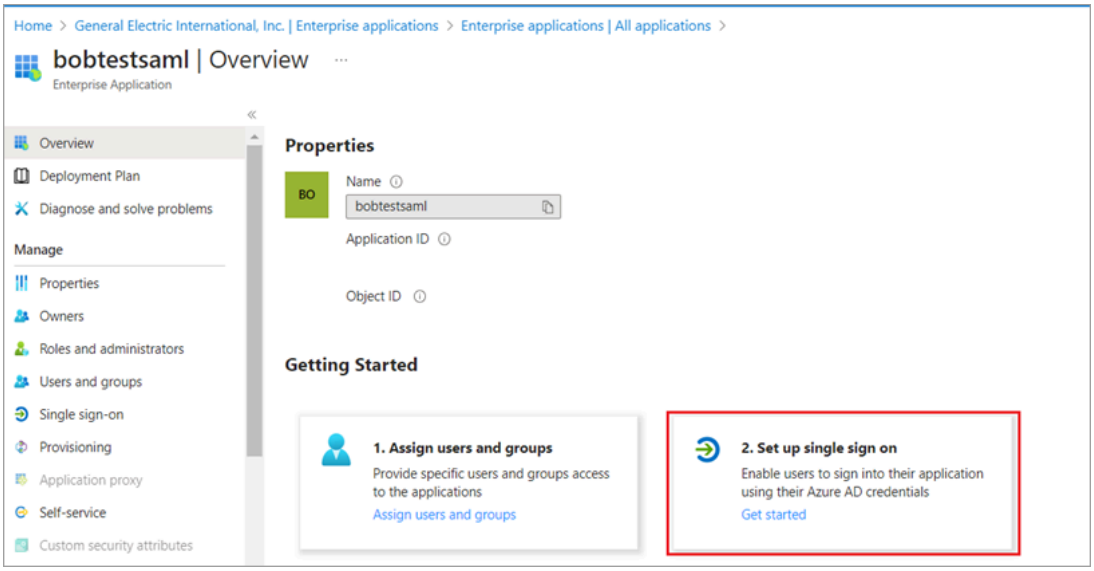


Tip:

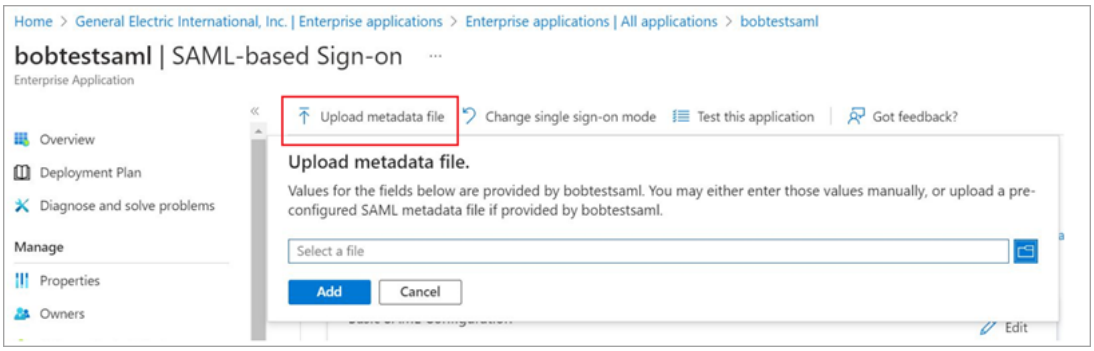
You can locate the application from recent searches, or running a search.

Searching application:	
If needed, request your IT Azure Expert team to create a new application from here:	

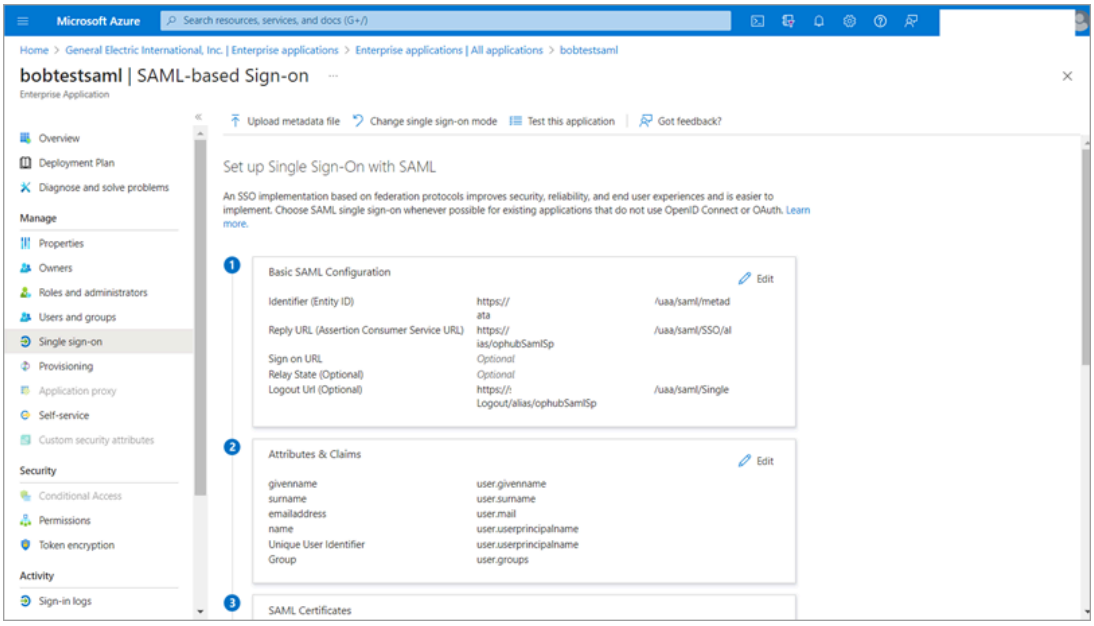
d. Open the enterprise application and select **Set up single sign on**.



e. Select **Upload metadata file** and upload the `saml-sp.xml` file we downloaded in the earlier step.

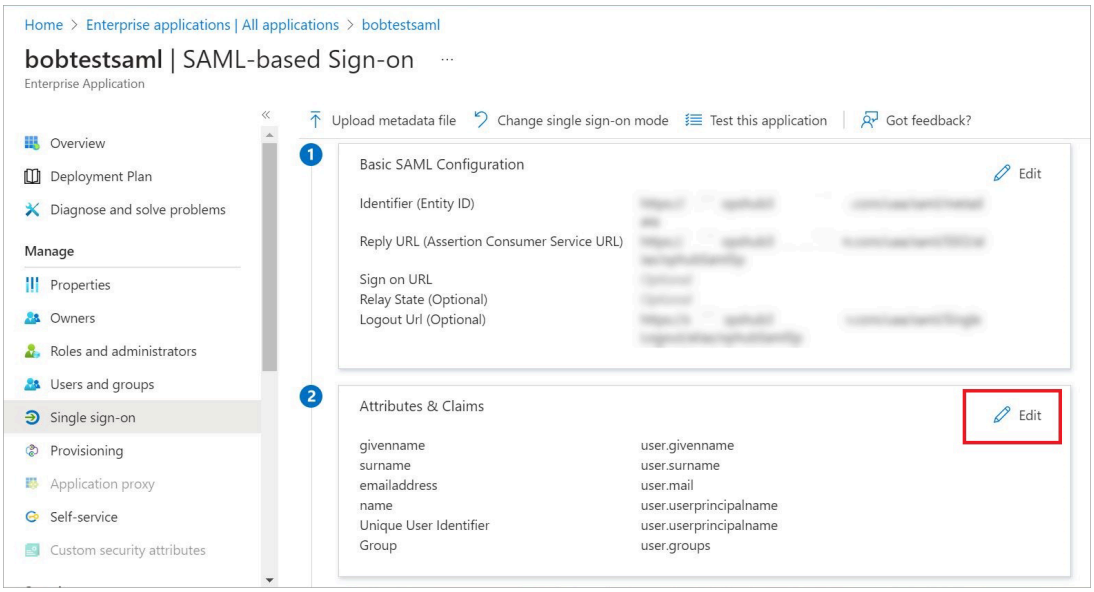


f. After the file is uploaded successfully, Azure displays the information from the `saml-sp.xml` file.

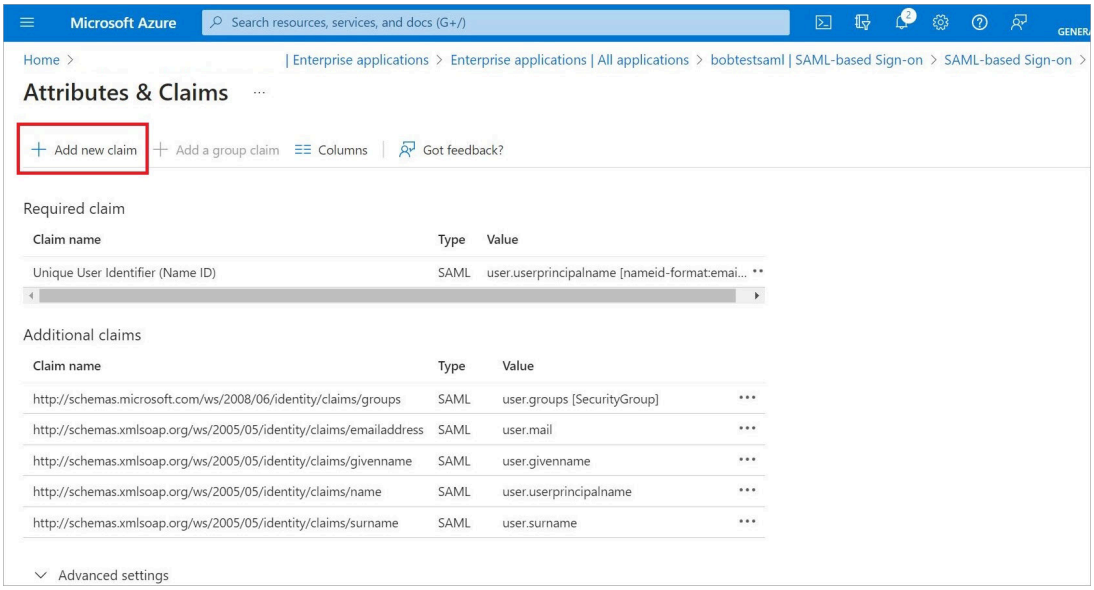


3. **Perform User and Group Attribute Mapping in Azure**

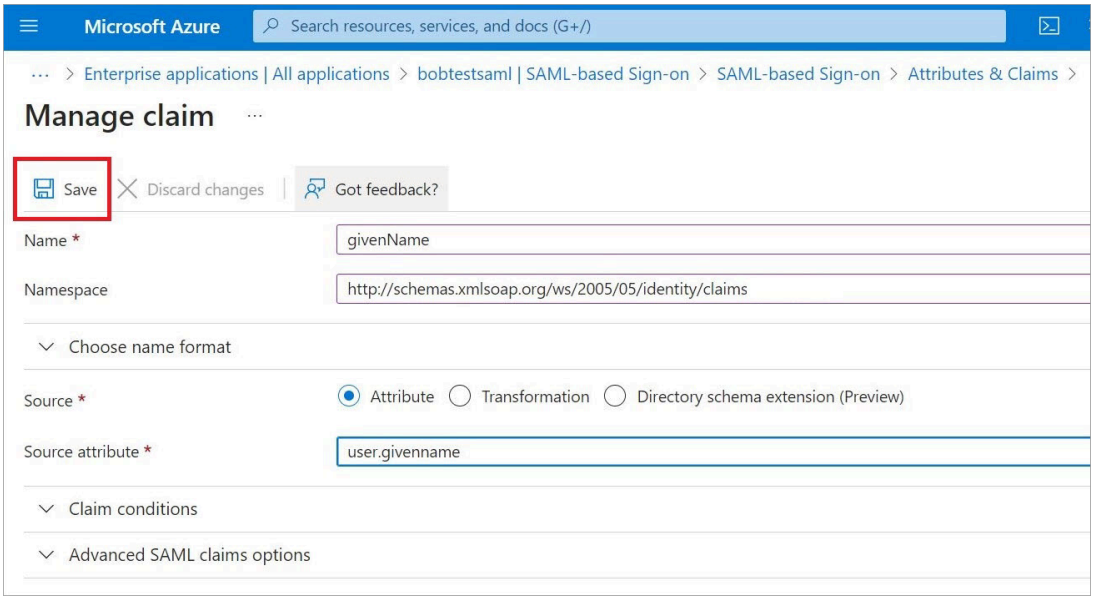
a. In the enterprise application, under **User Attributes & Claims** section, select **Edit**.



b. Select **Add new claim**.



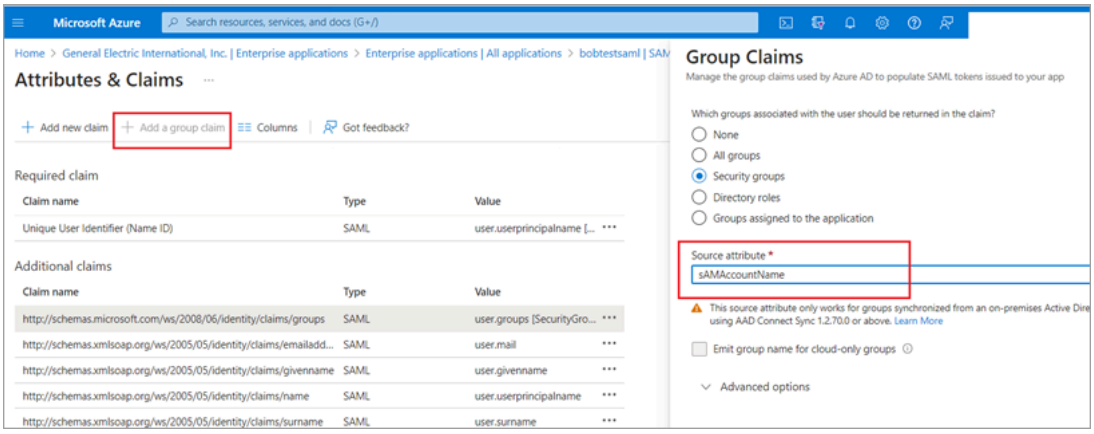
c. Enter claim details, and save the information.



Note:

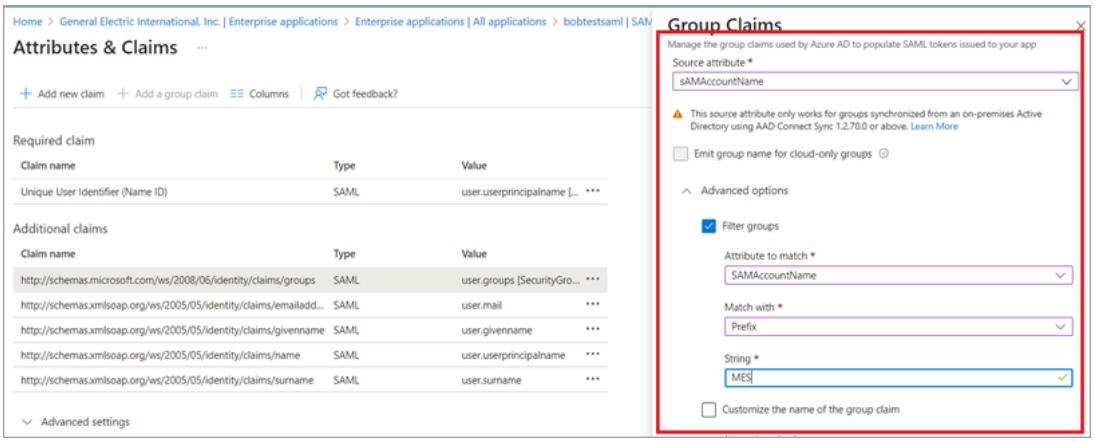
Make a note of the **Namespace** value. This value will be used later while setting up SAML Connection in Proficy Authentication.

d. To set up group claims, select **Add a group claim**.

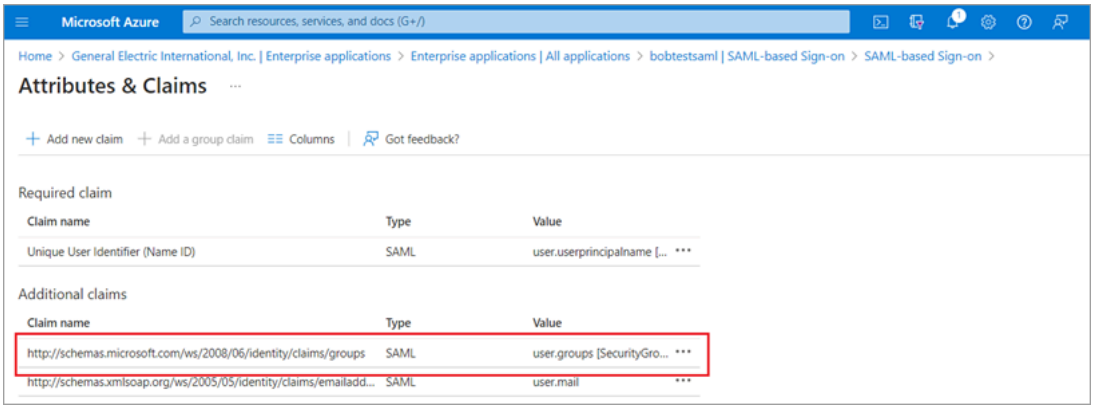


You can choose to provide **Advanced options** for the group claim as shown in the following screen shot.

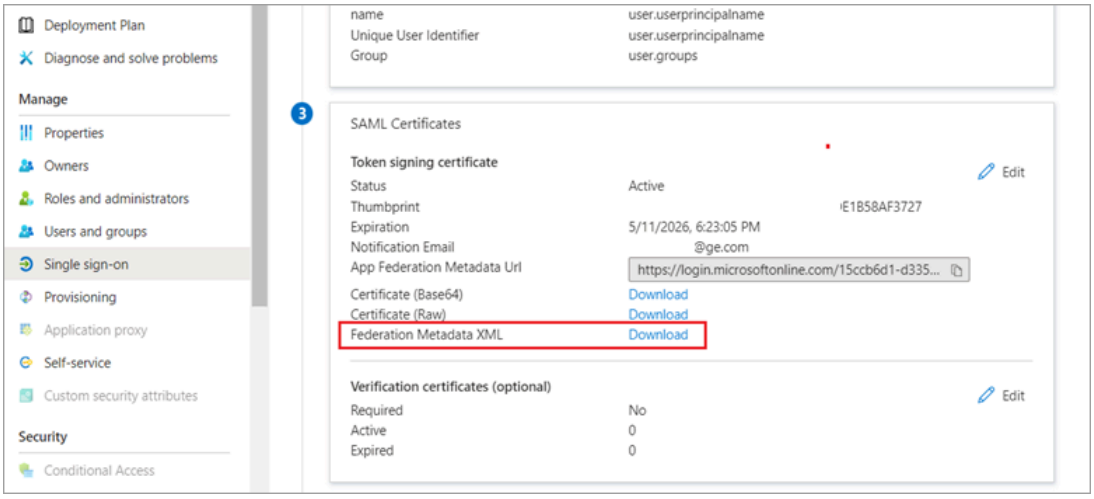
For example, string type is selected as `MES` because we want to cast our groups to start with MES, You can select as per your choice.



After updating the group claim, **Attribute & Claims** screen should look like as shown in the following screen shot. The highlighted claim name needs to be same while creating SAML Connection in Proficy Authentication.



e. Under the **SAML Signing Certificate** section, download the **Federation Metadata XML** file. We shall upload this file later when creating a SAML Connection from Proficy Authentication.

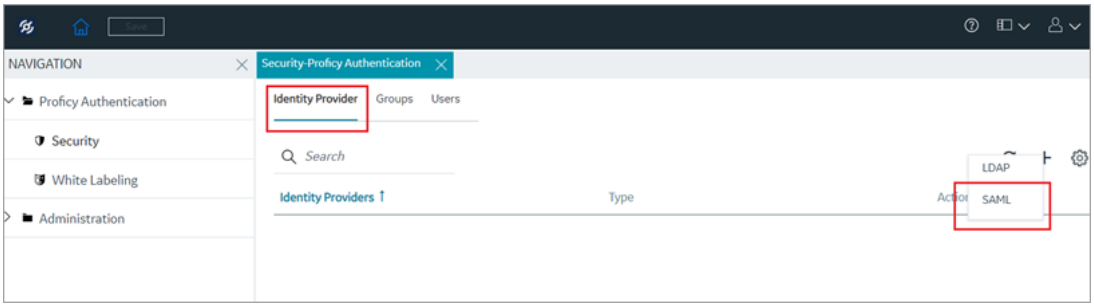


4. **Create SAML Connection in Proficy Authentication**

   a. Log in to Configuration Hub as an administrator.

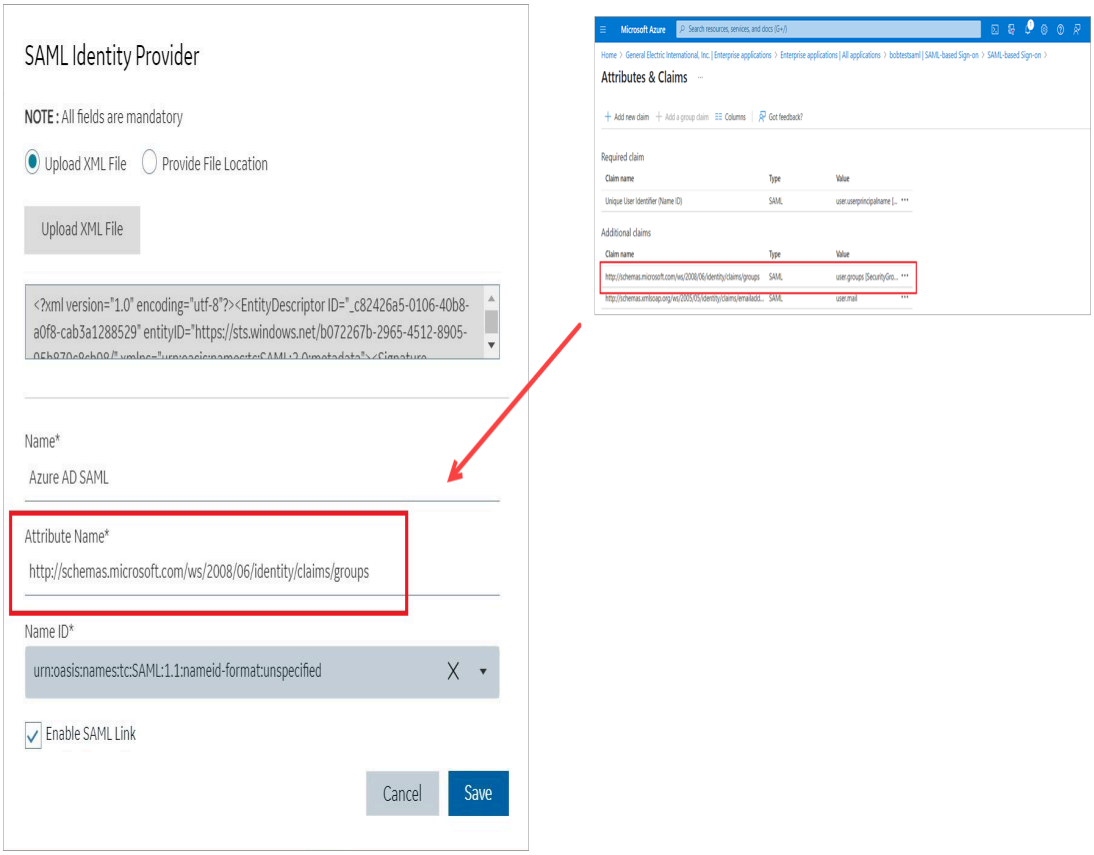
   b. Go to **Proficy Authentication > Security > Identity Provider**.

   c. Select +, then select **SAML**.

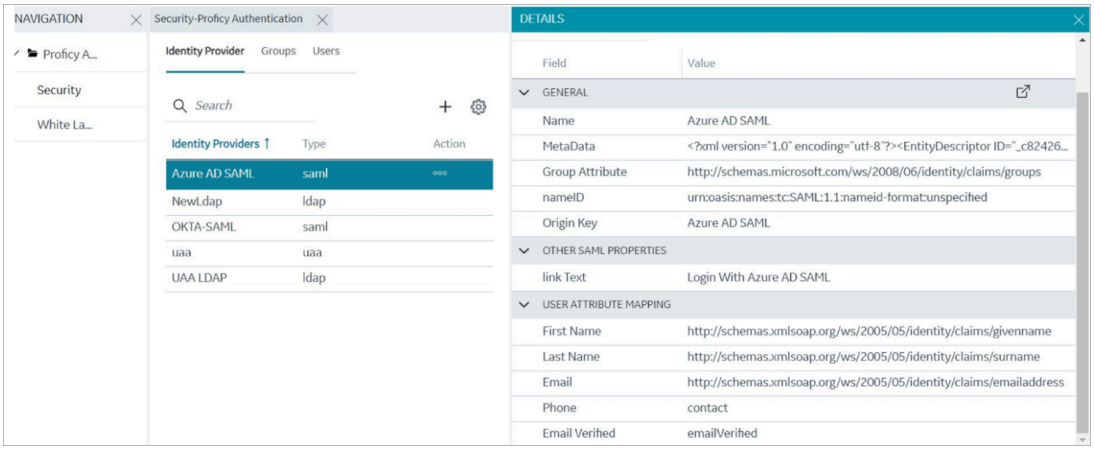


d. In the **SAML Identity Provider** pop-up screen, enter details.

Field Name	Description
Upload XML File	Upload the Federation XML downloaded from Azure. Refer to this step *(on page 170)*.
Name	Name of the SAML application. You can provide any name.
Attribute Name	Enter the Group Name mapping. Refer to this screen shot *(on page 169)*.
Name ID	From drop down, select `format:unspecified`.
Enable SAML Link	Select the check box.



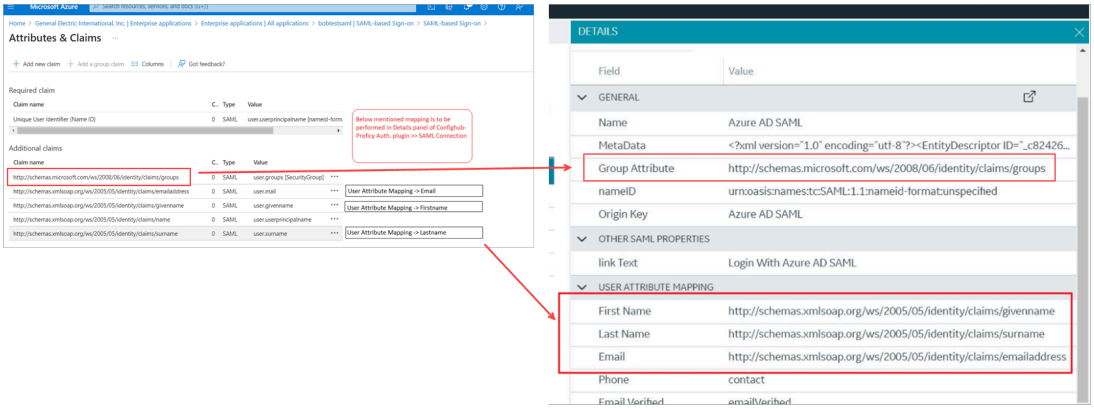
After successful SAML connection, the application screen should look something like this:



Important:

You must perform User Attribute Mapping, which involves taking values from the Azure **Attributes & Claims** page and linking them to the Details section of the

established SAML Connection in Proficy Authentication. Refer to the example screen shots below.



5. **Adding and Mapping UAA and SAML Groups**

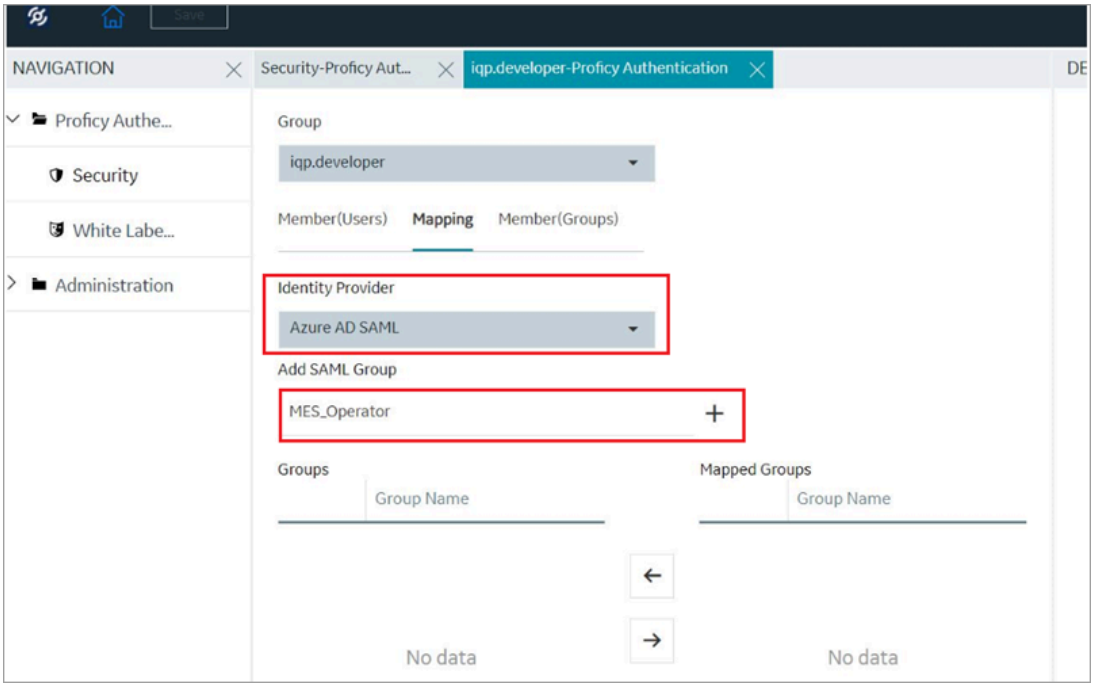
    a. Go to **Proficy Authentication > Security > Groups**.

    b. Double-click and open the group you want to map to SAML.

    c. Select the **Mapping** tab.

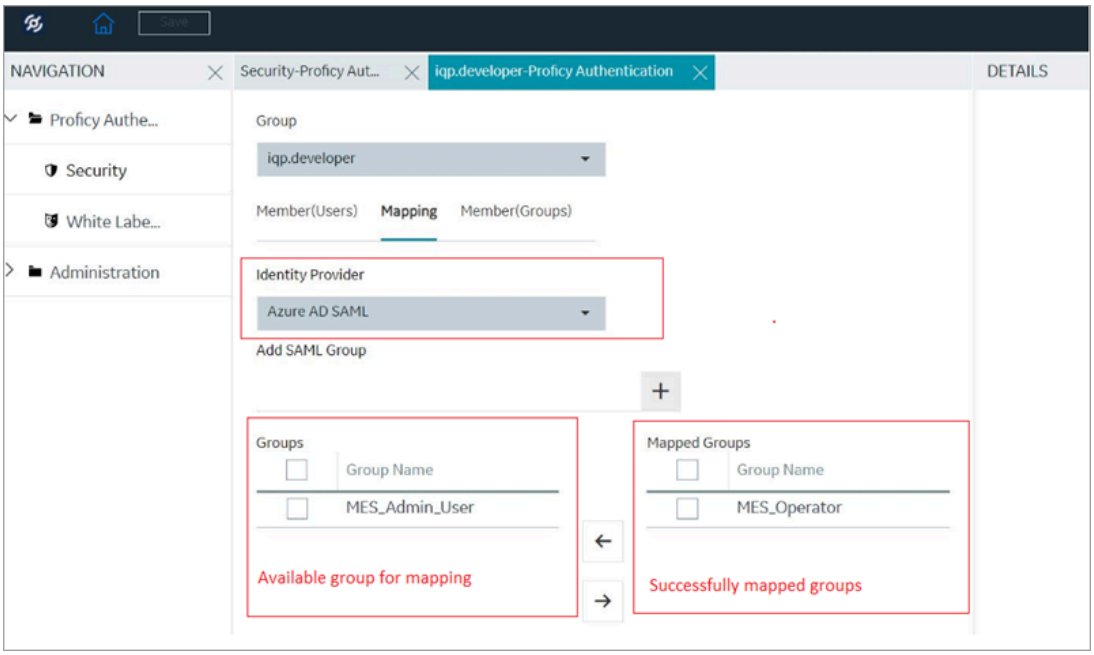
    d. Map SAML groups: From the **Identity Provider** drop down list, select the SAML record.

    e. To create SAML groups, enter the valid SAML group name in the **Add SAML Group** field and select the plus icon.



f. Select the check box for the groups you want to map to the Proficy Authentication group selected in step 5(b).

g. Select → to move the selected items from **Groups** to **Mapped Groups**.



If the mapped SAML groups are valid, then all their users become a member of the Proficy Authentication group selected in step 5(b).

6. **Test SAML Authentication**

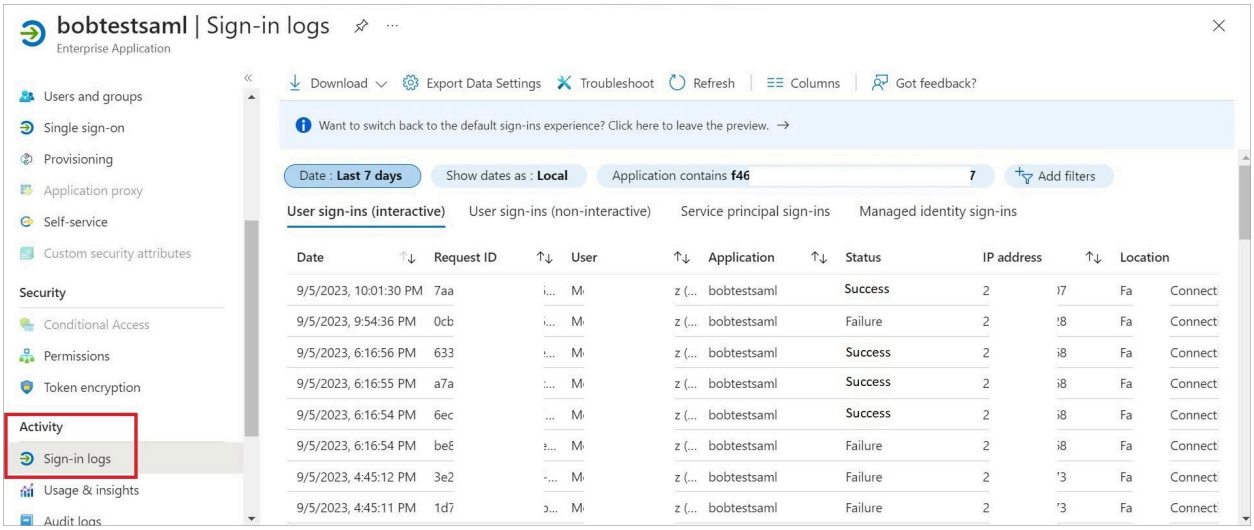
    a. Visit Operations Hub login page.

    b. Select **Sign In With Azure**.

Troubleshooting SAML-Related Issues

Addressing Login Issues With Azure:

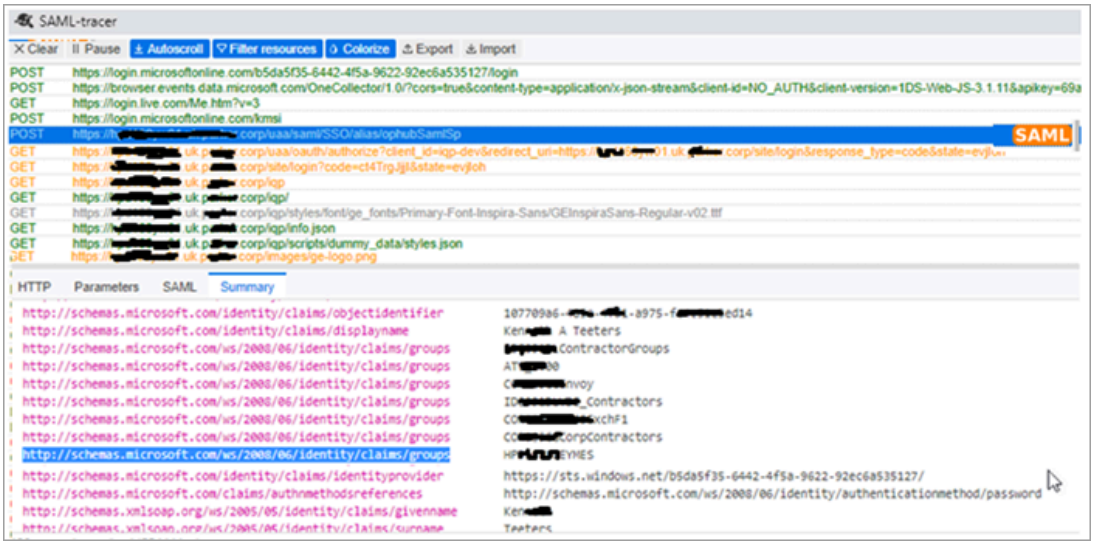
In Azure portal, you can access the logs to verify successful logins. This will help establish a baseline for successful authentication. Whenever login access is denied, closely review the login attempts in the logs.



Addressing Login Issues Without Azure:

You can use the SAML-tracer extension for Chrome to diagnose and resolve SAML-related problems in Operations Hub. Follow these steps:

1. **Install SAML-tracer**: Add the SAML-tracer extension to your Chrome browser.
2. **Access SAML-tracer**: Open SAML-tracer from your browser extensions.
3. **Reproduce the Issue**: Log in to Operations Hub as you normally would to reproduce the SSO login issue.
4. **Inspect SAML Messages**: In SAML-tracer, look for `POST` messages.
    a. Select the specific POST message related to the SSO login attempt.
    b. Next select the **Summary** tab for detailed information about the SAML attributes exchanged.
    c. Review the SAML attribute names and values exchanged during the SSO attempt, and compare them against the expected values.
    d. If you notice that the SAML group attribute names are incorrect (refer to screen shot), this could be the cause of the login issue.



    e. Replace the incorrect attribute names with the correct ones to fix the login issue.

Retrieving Azure Login Screen:

In case you encounter a situation where the Azure login screen does not appear, then do the following to address this issue:

- Check your SAML Azure configuration. Verify the group attribute name and the corresponding group name. Any mismatch in attribute names can lead to access issues.
- Clear your browser cache and login again.

Add SAML Identity Provider

This topic describes how to add multiple SAML accounts in Proficy Authentication.

Enable a SAML identity provider *(on page 155)*. For example, Okta or Azure AD or any other IDP.

You can add multiple SAML connections.

1. Log in to Configuration Hub as an administrator.
2. Go to **Proficy Authentication > Security > Identity Provider**.
3. Select +, then select **SAML**.

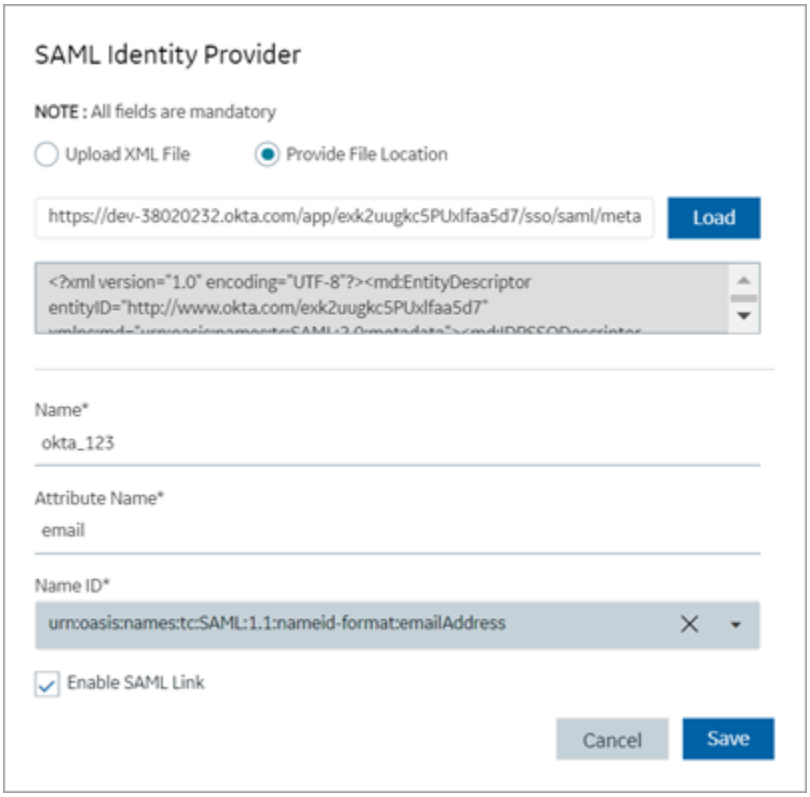
The **SAML Identity Provider** screen appears.

4. Enter the following details:

> **Note:**
> The XML file contains the metadata to interact with SAML enabled identity providers (Azure, ADFS, or Okta). Refer to Configure Okta as SAML IDP *(on page 157)*.

Field	Description
Upload XML File	Choose this option if you want to upload an XML document. Select **Upload XML File** to browse and locate the XML document from your local system. The uploaded data appears in a text box, and is read-only.
Provide File Location	Choose this option if you want to provide an external URL to the XML document.

Field	Description
	Enter the URL in the text field, and select **Load**. The data from the URL appears in a text box, and is read-only.
Name	Name of the SAML identity provider. You can provide any name. For example, `okta_123` or `demo_mach_azure`.
Attribute Name	The attribute that contains the group membership information about a user in a SAML assertion.
Name ID	SAML Name identifier and associated fields that you want to use in a link test.
Enable SAML Link	Select the check box.



5. Select **Save**.

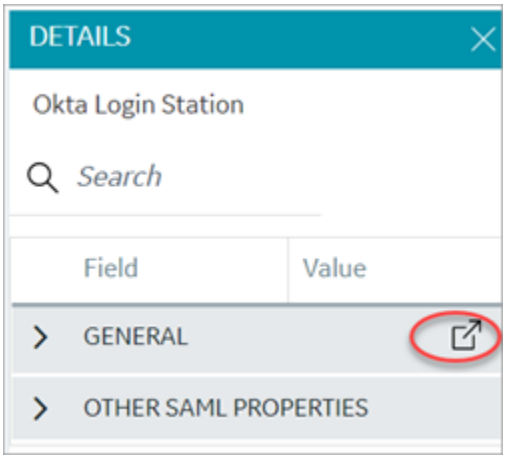
The SAML identity provider is created.

Modify SAML Identity Provider

This topic describes how to modify the existing details for a SAML account.

Add SAML Identity Provider *(on page 177)*

1. Log in to Configuration Hub as an administrator.
2. Go to **Proficy Authentication > Security > Identity Provider**.
   The existing list of identity providers appear.
3. Select the SAML identity provider you want to modify.
   The existing information for the identity provider appears on the **DETAILS** panel.
4. Select  to display the details in a pop-up screen.



   The **SAML Identity Provider** screen appears.
5. You can modify the existing information and save the changes.
6. You can also modify items under **OTHER SAML PROPERTIES** section. Enter a new value to replace the existing value.

Enable Multi-Factor Authentication

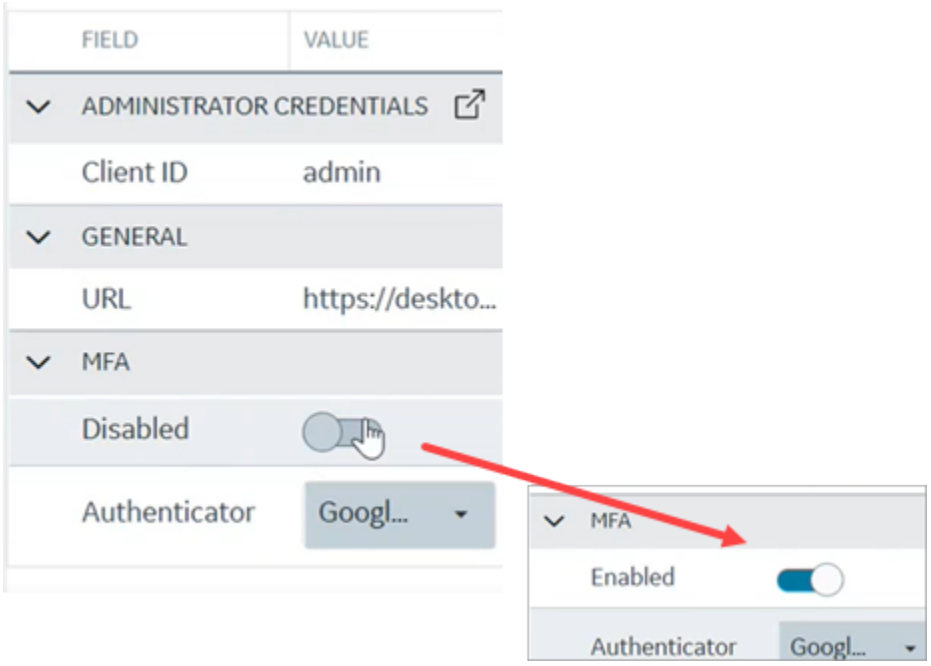
This topic describes how to enable multi-factor authentication for users.

Install the Google Authenticator app on your mobile device.

Only administrators can enable multi-factor authentication (MFA) for users.

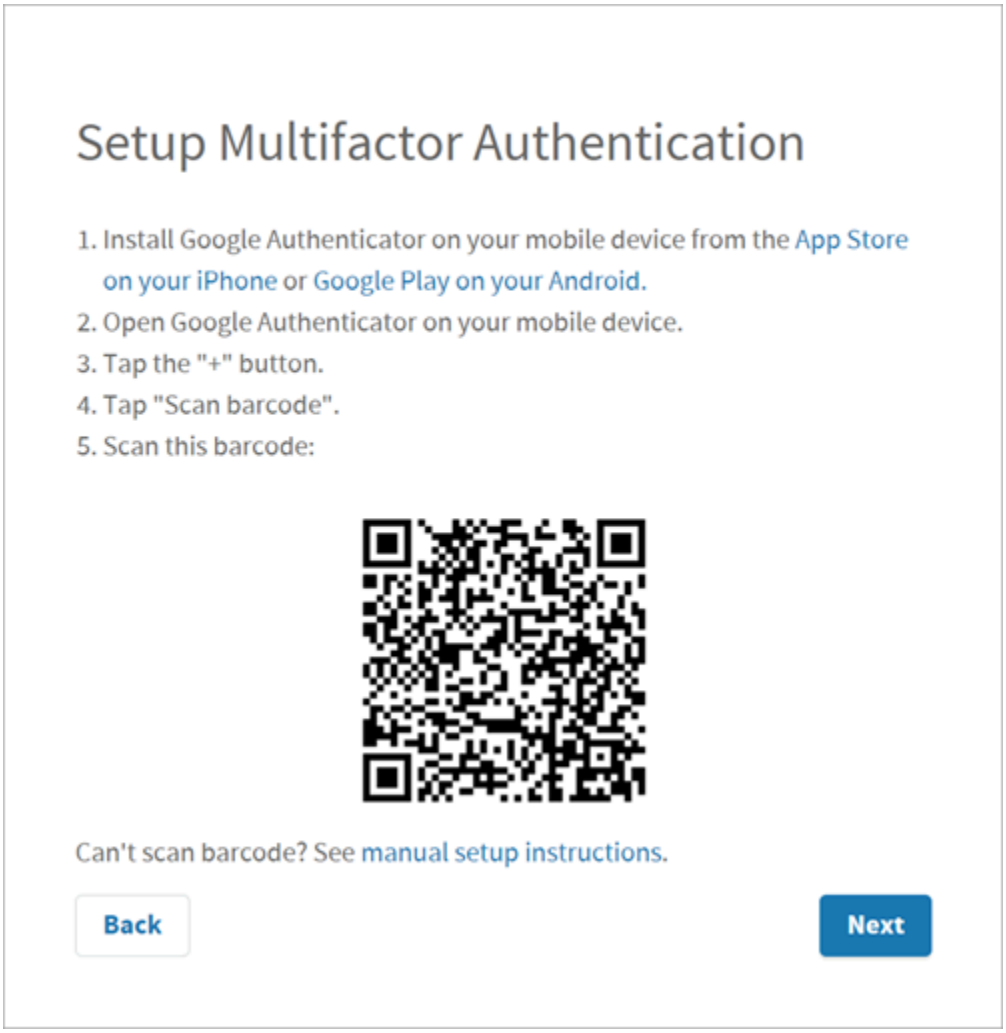
Note:
Enabling MFA also enables two-factor authentication for UAA and LDAP users as both the identity providers have a common login entry point.

1. Log in to Configuration Hub as an administrator.
2. Go to **Proficy Authentication > Security > Identity Provider**.
   The existing list of identity providers appear.
3. Select the `UAA` record for which you want to enable the multi-factor authentication.
   The option to enable MFA appears on the **DETAILS** panel under the **MFA** section.
4. Enable the toggle switch for MFA.
   By default, MFA is disabled.



   The multi-factor authentication for `UAA` is enabled.
5. Select **Authenticator**.
   Currently, Google authenticator is the only available authenticator.
6. Restart the `GE Proficy Authentication Tomcat Web Server` service.
7. Activate multi-factor authentication for user logins.
   You need to perform the following steps only for the first time for every user login.

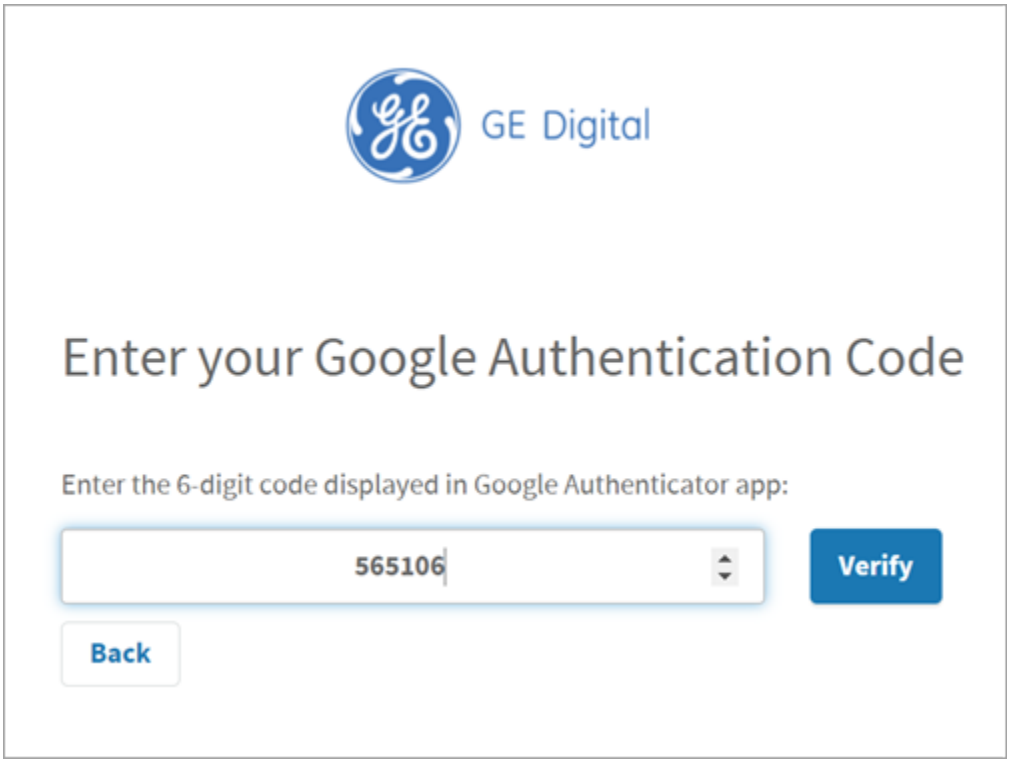
   a. Log in to Configuration Hub with UAA user credentials.
      The MFA setup screen appears with a barcode.



b. Open the Google Authenticator app on your mobile device and scan the barcode.
   The authentication app validates the user login and displays a 6-digit code. Barcode scanning appears only for the first time validation for every user login.

c. On your browser, select **Next** on the MFA setup screen.
   The code verification screen appears.

d. Enter the 6-digit code in the passcode field and select **Verify**



You are logged in successfully.

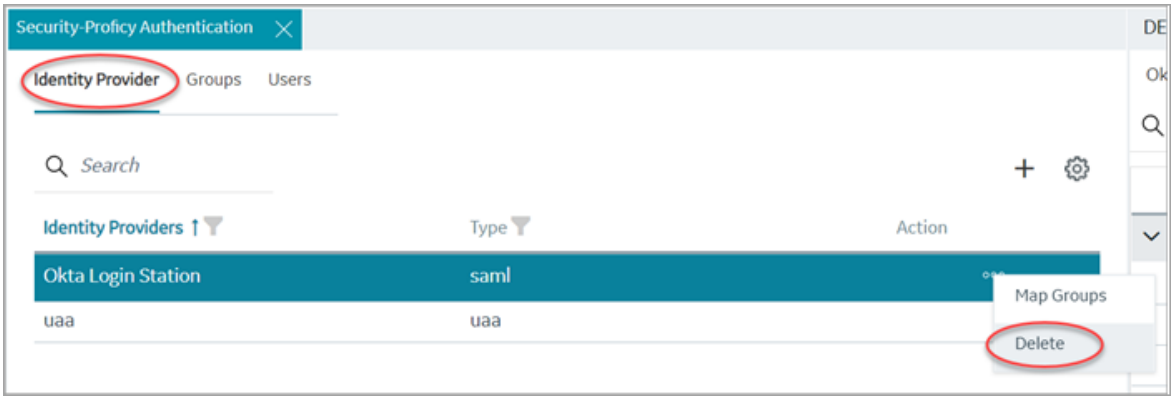
Multi-factor authentication is enabled for both UAA and LDAP users.

Delete Identity Provider

This topic describes how to delete identity providers.

Add SAML Identity Provider *(on page 177)*

1. Log in to Configuration Hub as an administrator.
2. Go to **Proficy Authentication > Security > Identity Provider**.
   The existing list of identity providers appear.
3. Select the identity provider you want to delete.
   Additional options appear under the **ACTION** column.
4. Select ⋯, then **Delete**.



A message appears to confirm the delete action.

5. Select **Delete**.

The identity provider record is deleted from the Proficy Authentication database.

Manage Groups

Overview of Managing Groups in Proficy Authentication

Groups are a collection of users who share common roles or responsibilities. Administrators can assign permissions and policies to entire groups, rather than individual users.

Groups make it easier to manage access control for multiple users with common requirements. Depending on your group membership, you will have access to different areas of an application. You can create groups and assign scopes that define the permission level granted to a client application.

- Scopes for Proficy Authentication Users/Groups *(on page 184)*
- Scopes for Operations Hub Users/Groups *(on page 184)*
- Scopes for iFIX Users/Groups *(on page 185)*
- Scopes for Historian Users/Groups *(on page 186)*
- Scopes for Plant Applications Users/Groups *(on page 188)*

Refer to these topics on how to work with groups within Proficy Authentication:

- Create Groups *(on page 189)*
- Modify Groups *(on page 191)*
- Map Groups *(on page 192)*
- Add/Remove Users in a Group *(on page 195)*

- Add/Remove Sub-Groups in a Group *(on page 196)*
- Delete Group *(on page 197)*

Scopes for Proficy Authentication Users/Groups

This topic provides a list of scopes you can assign to users/groups for accessing Proficy Authentication.

Refer to the Cloud Foundry's documentation for a complete list of UAA scopes.

https://docs.cloudfoundry.org/concepts/architecture/uaa.html#uaa-scopes

Scopes for Operations Hub Users/Groups

This topic provides a list of scopes you can assign to users/groups for accessing Operations Hub.

To access both the designer and runtime features in Operations Hub, a user must possess, at a minimum, the `iqp.developer` and `iqp.user` scopes.

Scope	Description
`iqp.developer`	This scope is assigned to developer users. When a developer account is created, an associated application user account is automatically generated, sharing the same login credentials. Users with this scope have the ability to access pages for application creation, granting them access to both application design and runtime functionality.
`iqp.user`	This scope is assigned to application users. Users with this scope can only access those applications in Operations Hub to which they have been granted access. These users do not have the ability to access pages for application creation. Their access is solely restricted to the runtime functionality of the applications.
`iqp.clouduser`	This scope is assigned to users who want to use the REST API, mainly the M2M Device RESTful APIs.
`iqp.nodered`	This scope is assigned to users who want to access the Dataflow Editor.
`iqp.studioAdmin`	This scope is assigned to privileged users.

Scope	Description
	Users with this scope can access the Administrator Console to configure global settings for an Operations Hub instance, such as the settings for email servers and the MQTT brokers for MQTT data interoperability. **Note:** This scope does NOT grant access to Operations Hub designer or runtime.
`iqp.tenantAdmin`	This scope is assigned to privileged users. Users with this scope gain administrative authority at the Tenant or System level (in our case, we have one tenant). They enjoy full administrative access to the Operations Hub instance, with the exception of scenarios requiring membership in the `iqp.studioAdmin` group. Administrators with this scope have the ability to unlock an application that may be locked by another user.

Scopes for iFIX Users/Groups

This topic provides a list of scopes you can assign to users/groups for accessing iFIX.

Refer to the following table to assign access to specific areas/functionalities of iFIX:

Scope	Description
`scada.fix_shared_IFIX_PROFICY_AUTH_ADMIN`	Allows access to all iFIX application features. Any Proficy Authentication user who is a member of this group will have privileges similar to a native iFIX ADMIN user (except the access to security areas). Proficy Authentication users who want to directly log in to iFIX can use this group. This group is not available by default when you upgrade from iFIX 6.1 or 6.5. You must manually create this group with all the iFIX application features as needed.
`scada.fix.shared.APPLICATION_DESIGNER`	Allows a user to access Configuration Hub and provides use of iFIX features such as iFIX connection, database, and model management.

Scope	Description
	Important: `scada.fix.shared.APPLICATION_DESIGNER` is not available by default when you upgrade from iFIX 6.1 or 6.5. You must manually create the group with the required iFIX application features, or update your existing groups to include the following iFIX application features (if you want users in these groups to have access to and use Configuration Hub). • Database Block Add-Delete • Database Manager • Database Reload • Database Save • Security Configuration • System Configuration
`scada.fix.shared.OPERATORS`	Allows run mode only access for a user in iFIX.
`scada.fix.shared.SUPERVISORS`	Allows access to WorkSpace run and configure mode, as well as access to background task exit, iFIX system shut down, and iFIX system user login.
`scada.proficy.admin:`	Allows the Proficy Authentication user access to the iFIX Projects panel and to the Deploy operations from Configuration Hub. This group is for Proficy Authentication only; this group is not linked to any iFIX group and has no permissions in iFIX.

Scopes for Historian Users/Groups

This topic provides a list of scopes you can assign to users/groups for accessing Historian.

Refer to the following table to assign access to specific areas/functionalities of Historian:

Scope	Description
`historian_visualization.admin`	Provides access to Trend Client and the Web Admin console.
`historian_visualization.user`	Allows access to Trend Client.
`historian_rest_api.read`	Provides read access to public REST API.
`historian_rest_api.write`	Provides write access to public REST API.
`historian_rest_api.admin`	Provides read/write access to public REST API.
`historian_enterprise.admin`	Provides read/write access to Configuration Hub APIs.
`historian_enterprise.user`	Allows access to Configuration Hub APIs.
`ih_archive_admins`	Provides the ability to create, modify, and remove archives.
`ih_audited_writers`	Allows data writes and to produce a message each time a data value is added or changed.
`ih_collector_admins`	Allows the ability to add collector instances and change their destination.
`ih_readers`	Provides access to the ability to read data and system statistics. Also allowed access to Historian Administrator.
`ih_security_admins`	Provides access to Historian power security users. Security administrators have rights to all Historian functions.
`ih_tag_admins`	Provides access to allow the ability to create, modify, and remove tags. Tag-level security can override rights given to other Historian security groups. Tag admins can also browse collectors.
`ih_unaudited_logins`	Allow connections to the Data Archiver without creating login successful audit messages.
`ih_unaudited_writers`	Provides the ability to write data without creating any messages. Tag, archive, and collector changes log

Scope	Description
	messages regardless of whether the user is a member of the ih_audited_writers group.
`historian_visualization.admin`	Provides access to Trend Client and the Web Admin console.
`historian_visualization.user`	Allows access to Trend Client.

Scopes for Plant Applications Users/Groups

This topic provides a list of scopes you can assign to users/groups for accessing Plant Applications.

By default, Plant Applications administrative users are granted all the scopes. For other type of users, you need to assign the specific scope to grant access to the respective module.

These are the scopes associated with the different modules of Plant Applications:

Scope	Applies To
`mes.route_management.user`	Route Editor
`mes.security_management.user`	Security
`mes.time_booking.user`	Time Booking
`mes.operations.user`	Unit Operations
`mes.waste.user`	Waste
`mes.order_management.user`	Work Order Manager
`mes.work_queue.user`	Work Queue
`mes.lineoverview.user`	Line Overview
`mes.my_machines.user`	My Machines
`mes.ncm_management.user`	Non Conformance
`mes.equipment.user`	OEE Dashboard
`mes.operatorlog.user`	Operator Log
`mes.process_orders.user`	Process Orders
`mes.property_definition.user`	Property Definition
`mes.receiving_inspection.user`	Receiving Inspection

Scope	Applies To
`mes.reports.user`	Reports
`mes.genealogy.user`	Genealogy
`mes.activities.user`	Activities
`mes.alarms.user`	Alarm Notifications
`mes.alarms.user`	Alarms
`mes.analysis.user`	Analysis
`mes.approval_cockpit.user`	Approval Cockpit
`mes.autolog.user`	Autolog
`mes.bom_editor.user`	BOM Editor
`mes.configuration_management.user`	Configuration
`mes.downtime.user`	Downtime
`mes.engineeringChangeOrder.user`	Engineering Change Orders

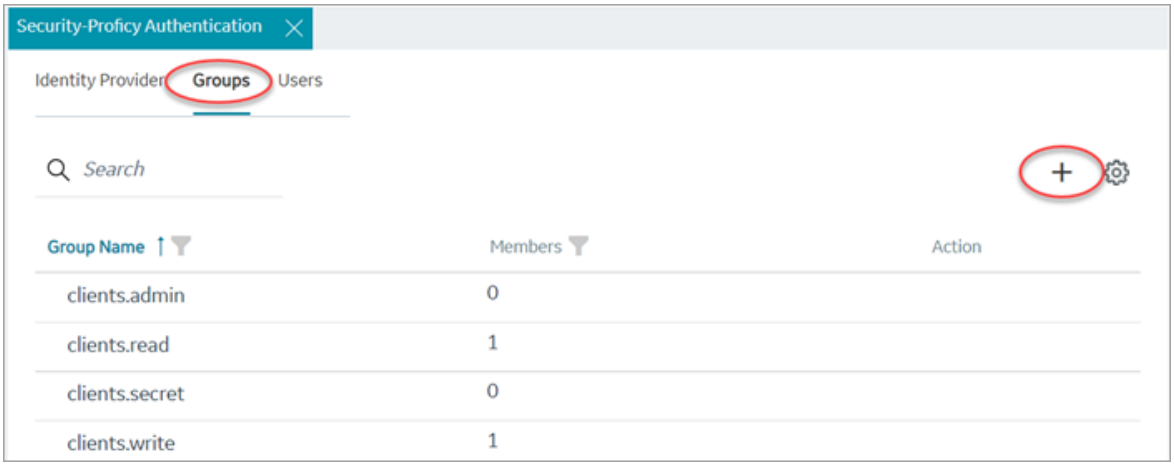
Create Groups

This topic describes how to create new groups in Proficy Authentication.

Log in to Configuration Hub as an administrator.

For example, you can create a group for users who perform the same task on the same resource. You can have a group of supervisors for each line such as, `Supervisors_LineA`, `Supervisors_LineB`, `Supervisors_LineC`.

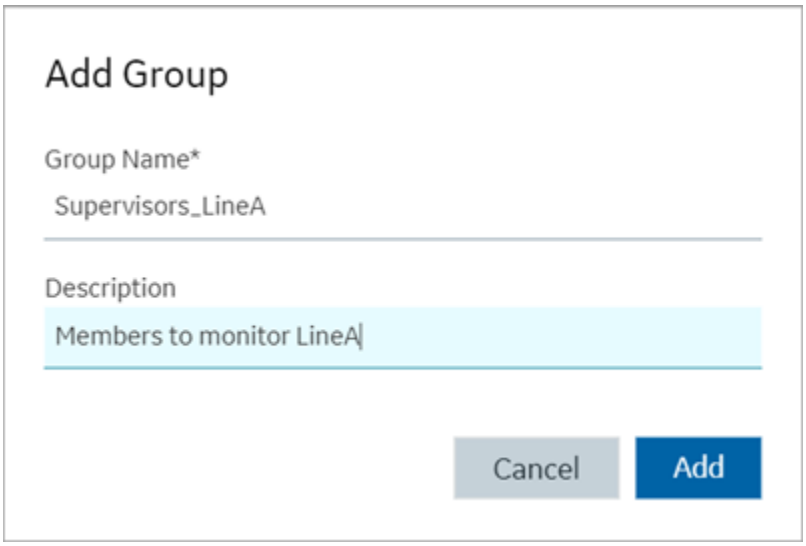
1. Go to **Proficy Authentication > Security > Groups**.
2. Select +



The **Add Group** screen appears.

3. Enter the following details for the new group.

Field	Description
Group Name	A unique name of the group that does not match with any existing Proficy Authentication groups. For example, `Supervisors_LineA`
Description	A brief description of the group.



4. Select **Add**.
   The group is created successfully.

The newly created group is added to the list of groups on the **Groups** tab.

Modify Groups

This topic describes how to modify existing groups in Proficy Authentication.

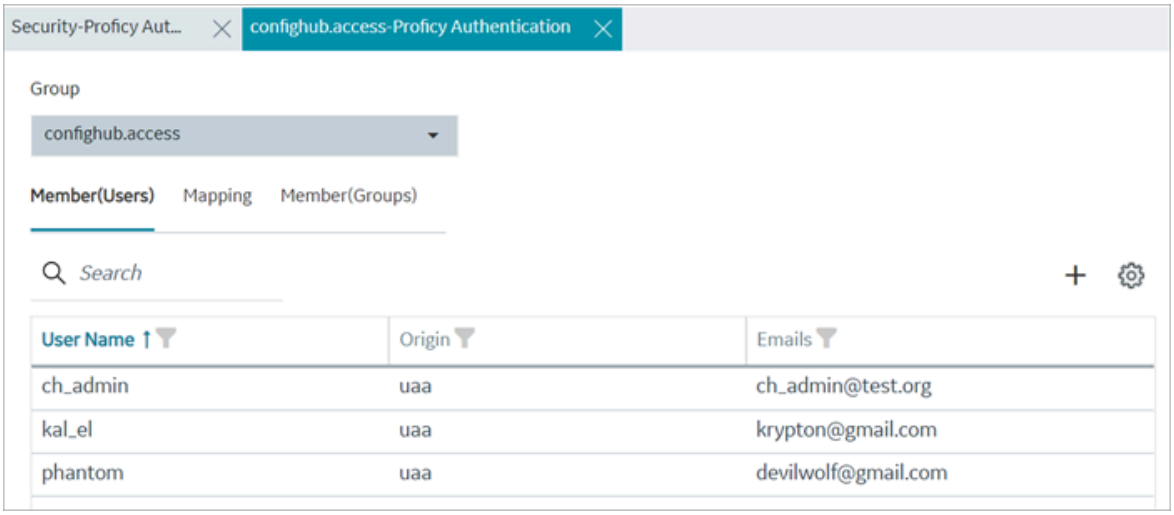
Log in to Configuration Hub as an administrator.

You can modify a group to:

- Add/Remove Users in a Group *(on page 195)*
- Add/Remove Sub-Groups in a Group *(on page 196)*
- Map Groups *(on page 192)*

1. Go to **Proficy Authentication > Security > Groups**.
   The existing list of Proficy Authentication groups appear.
2. Use any of these options to open a group.
   - Double-click the group name you want to modify.
   - For the group you want to modify, from its **ACTION** column, select ..., then **Edit**.

   The group opens in a new tab.



3. You can modify the following:

Tab	Description
Member (Users)	Displays the list of users added to this group. Add/Remove Users in a Group *(on page 195)*.

Tab	Description
Mapping	Displays the list of mapped groups for this group. You can add/remove mapped groups *(on page 192)*.
Member (Groups)	Displays the list of sub-groups added to this group. Add/Remove Sub-Groups in a Group *(on page 196)*.

Map Groups

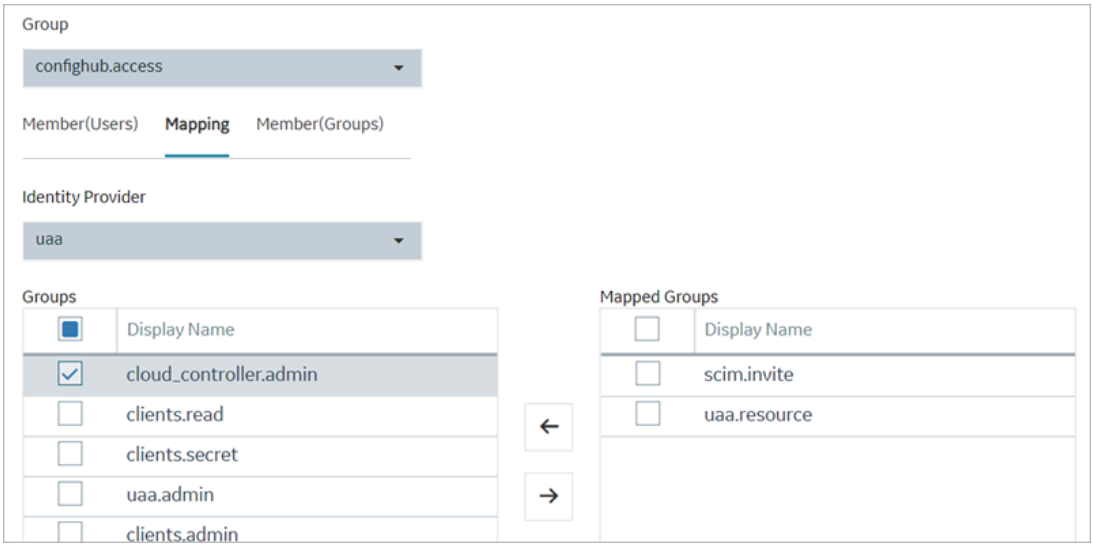
This topic describes how to perform group mapping.

Log in to Configuration Hub as an administrator.

You can map any of the following to a Proficy Authentication group. The users belonging to these groups gain access to Proficy Authentication, and become a member of the target group.

- UAA groups
- LDAP
- SAML groups

1. Go to **Proficy Authentication > Security > Groups**.
   The existing list of Proficy Authentication groups appear.
2. Double-click and open the group you want to map to UAA/LDAP/SAML groups.
3. Select the **Mapping** tab.
4. Map UAA groups.
   a. From the **Identity Provider** drop down list, select the UAA record.
      The groups from the UAA record appear.
   b. Select the check box for the groups you want to map to the Proficy Authentication group selected in step 2.
   c. Select → to move the selected items from **Groups** to **Mapped Groups**.



The users belonging to the mapped UAA groups are now a member of the Proficy Authentication group selected in step 2.

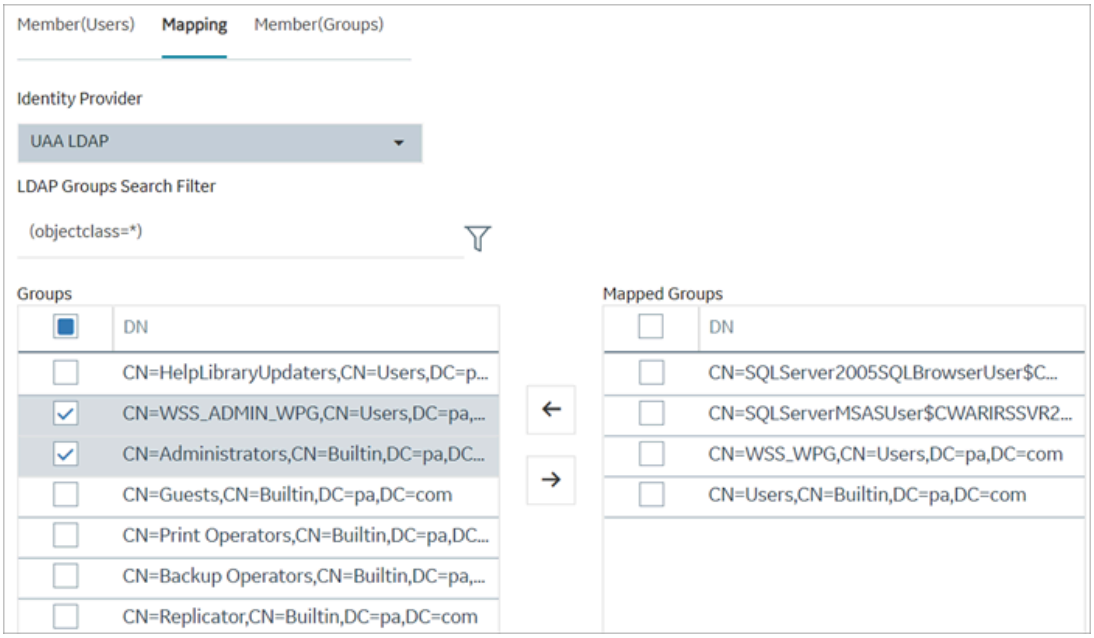
5. Map LDAP groups.

    a. From the **Identity Provider** drop down list, select the LDAP record.
    The groups from the LDAP server appear.

    b. Select the check box for the groups you want to map to the Proficy Authentication group selected in step 2.

    c. **Optional:** To search for an LDAP group, enter the keyword in the **LDAP Groups Search Filter** field and select .

    d. Select to move the selected items from **Groups** to **Mapped Groups**.

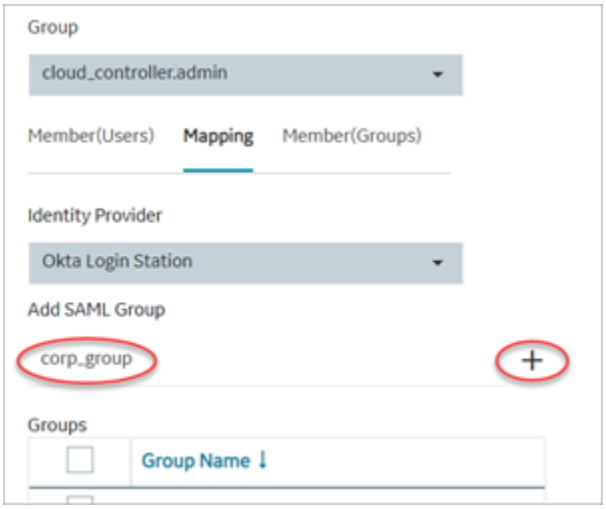


The users belonging to the mapped LDAP groups are now a member of the Proficy Authentication group selected in step 2.

6. Map SAML groups.

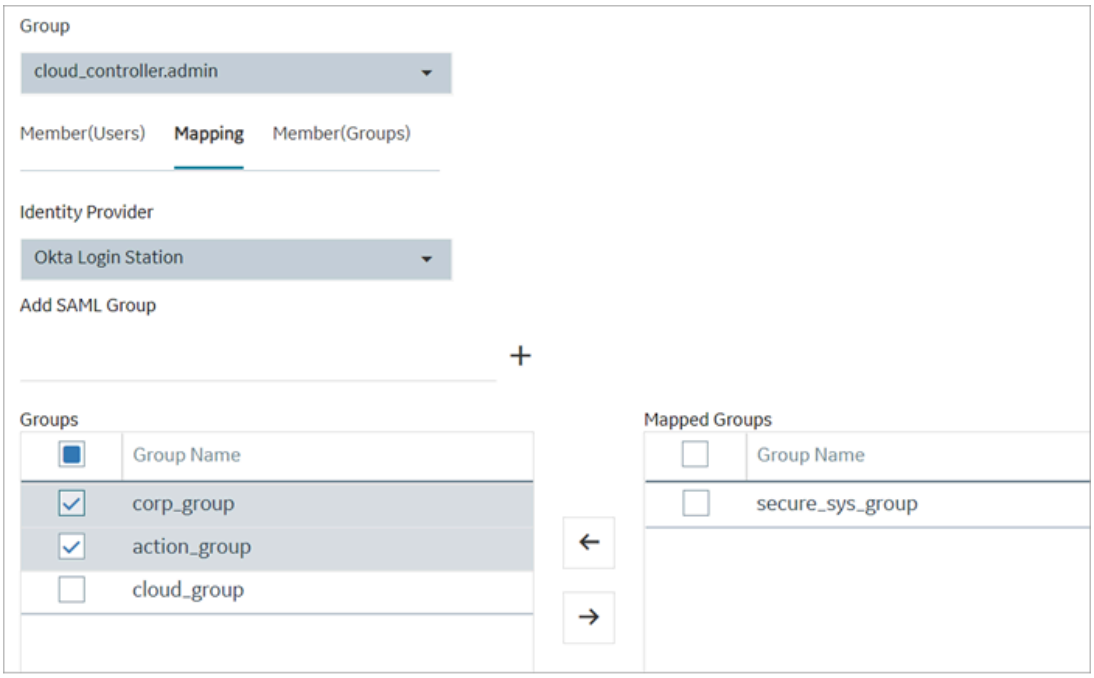
    a. From the **Identity Provider** drop down list, select the SAML record.

    b. To create SAML groups, enter the valid SAML group name in the **Add SAML Group** field and select the plus icon.



    c. Select the check box for the groups you want to map to the Proficy Authentication group selected in step 2.

d. Select → to move the selected items from **Groups** to **Mapped Groups**.



If the mapped SAML groups are valid, then all their users become a member of the Proficy Authentication group selected in step 2.

7. To unmap any of the mapped groups, select and move them back to **Groups**.

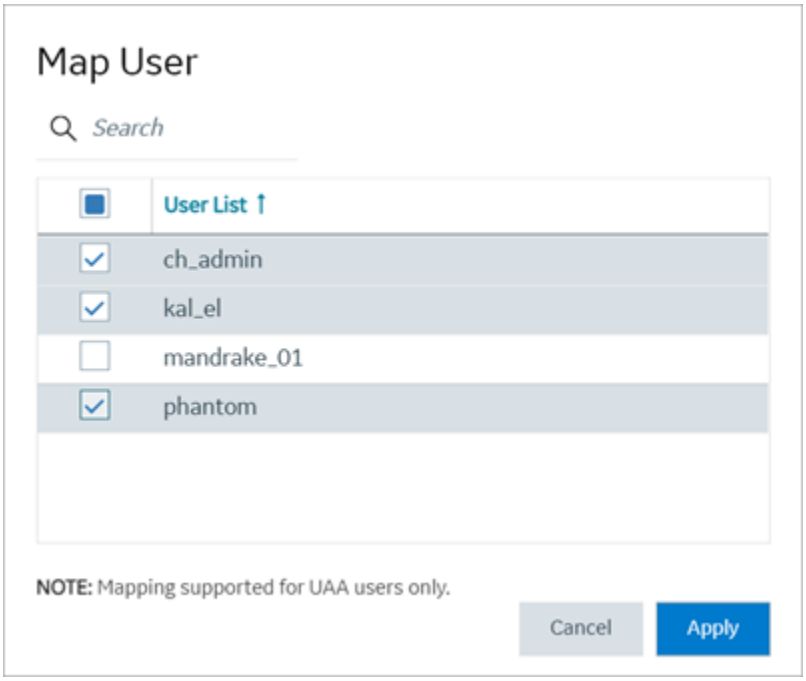
UAA/LDAP/SAML groups are successfully mapped.

Add/Remove Users in a Group

This topic describes how to add or remove users from a group.

Modify a group *(on page 191)* to add or remove users.

1. Select the **Member (Users)** tab.
2. Select +.
   The **Map User** screen appears.
3. Select the check box for the user account you want to add to the group.
   To remove user from a group, clear the check box.



4. Select **Apply**.

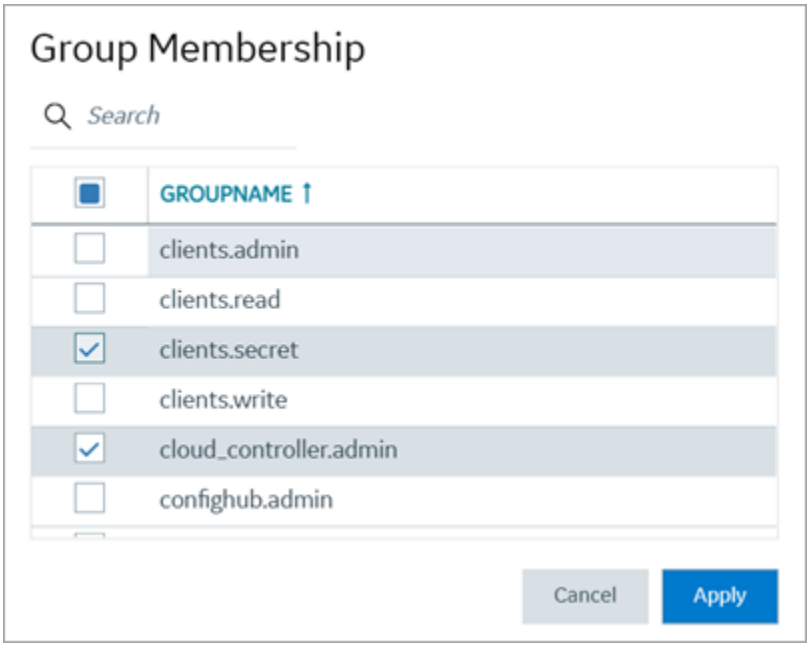
The users are added to (or removed from) the group.

Add/Remove Sub-Groups in a Group

This topic describes how to add or remove sub-groups from a group.

Modify a group *(on page 191)* to add or remove sub-groups.

1. Select the **Member (Groups)** tab.
2. Select +.
   The **Group Membership** screen appears.
3. Select the check box for the group/s you want to add as a sub-group.
   To remove a sub-group from a group, clear the check box.



Important:
Do not select the check box for `iqp.studioAdmin` group for any users or groups. As this group is for reserved purposes, make sure no user accounts or groups are assigned to this group to avoid runtime errors.

4. Select **Apply**.
   The groups are added (or removed) as sub-groups in the group.

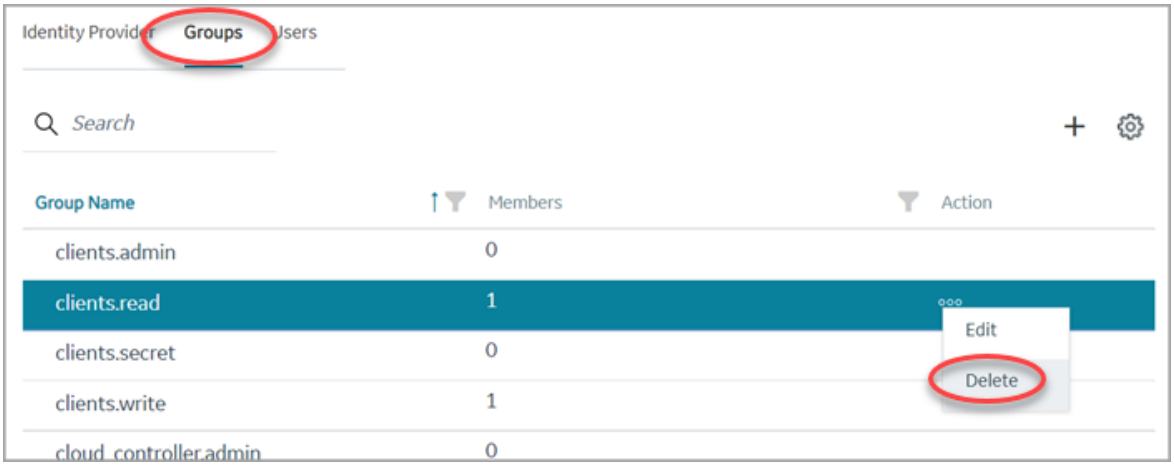
The users added to the sub-groups are automatically associated to the main group.

Delete Group

This topic describes how to delete Proficy Authentication groups.

Log in to Configuration Hub as an administrator.

1. Go to **Proficy Authentication > Security > Groups**.
   The existing list of groups appear.
2. Select the group you want to delete.
   Additional options appear under the **ACTION** column.
3. Select , then **Delete**.



A message appears to confirm the delete action. The message also informs if users are associated to the group being deleted.

4. Select **Delete**.

The group account is deleted from the Proficy Authentication database.

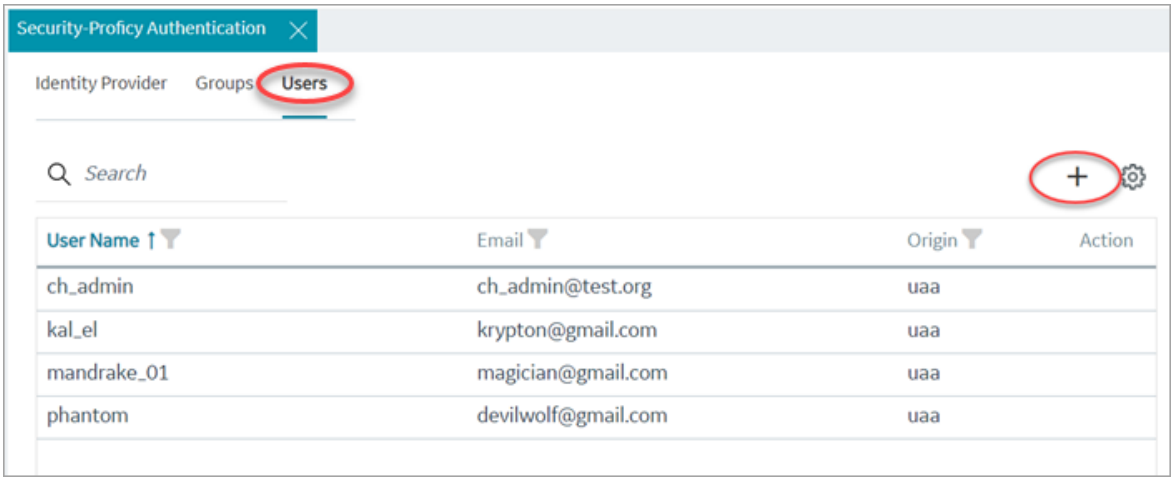
Manage Users

Create Users

This topic describes how to create new users in Proficy Authentication.

Log in to Configuration Hub as an administrator.

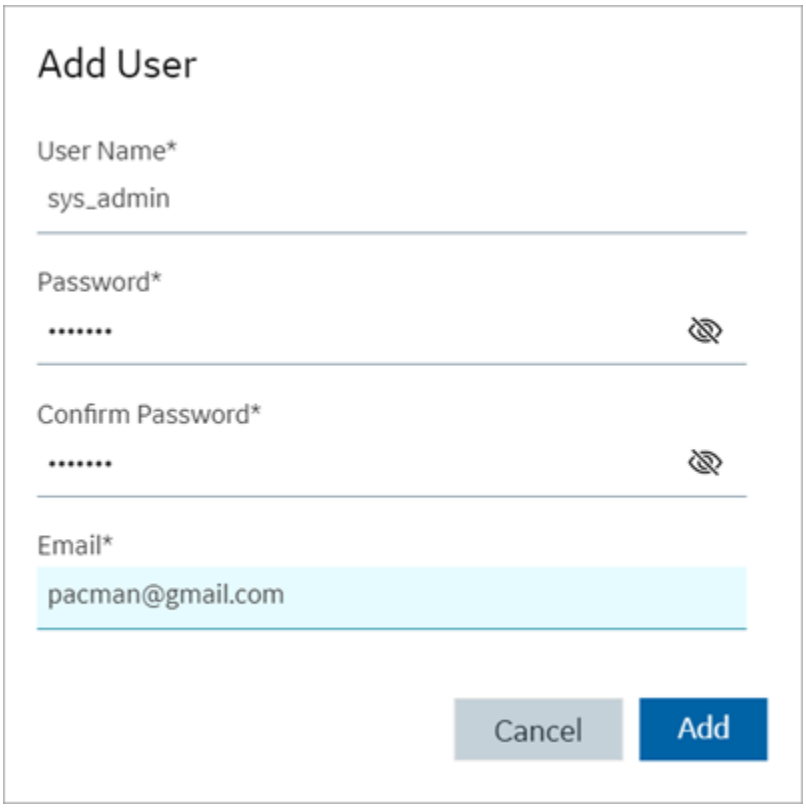
1. Go to **Proficy Authentication > Security > Users**.
2. Select +



The **Add User** screen appears.

3. Enter the following details for the new user account.

Field	Description
User Name	The user name to log in to Proficy Authentication.
Password	The password to log in to Proficy Authentication.
Confirm Password	Enter the password again for confirmation.
Email	User's email address.



4. Select **Add**.
   The user is created and added to the list of user accounts on the **Users** tab.

The new user is associated to default Proficy Authentication groups. These default groups cannot be deleted or modified: `approvals.me`, `cloud_controller.read`, `cloud_controller.write`, `cloud_controller_service_permissions.read`, `oauth.approvals`, `openid`, `password.write`, `profile`, `roles`, `scim.me`, `scim.userids`, `uaa.offline_token`, `uaa.user`, `user_attributes`.

Every user/client must possess the following three scopes to access the Security plug-in via Configuration Hub. If these scopes are not added, then a warning message alerts the user to contact Admin.

Scope	Description
`uaa.admin`	This scope indicates that this is a superuser.
`clients.write`	This scope resets the Security plug-in's admin client secret.
`password.write`	This admin scope enables to change the user password. **Note:** This scope is assigned to all the UAA/LDAP/SAML users by default without the need to assign manually.

Default `ch_admin` has all the three scopes.

For user accounts originating from LDAP or SAML, refer to Add LDAP/SAML Users *(on page 200)*.

Add LDAP/SAML Users

This topic describes how to add LDAP/SAML users to Proficy Authentication.

You must have an LDAP or SAML user account.

Only user accounts created in Proficy Authentication are immediately visible in the users list. LDAP or SAML users must perform the following steps to create user accounts in Proficy Authentication.

Log in to Proficy Authentication with LDAP/SAML user credentials.
A shadow user is created in Proficy Authentication, and can be subsequently seen in the Proficy Authentication users list.

The LDAP/SAML user account is added to the list of accounts on the **Users** screen.

Add/Remove Groups for a User

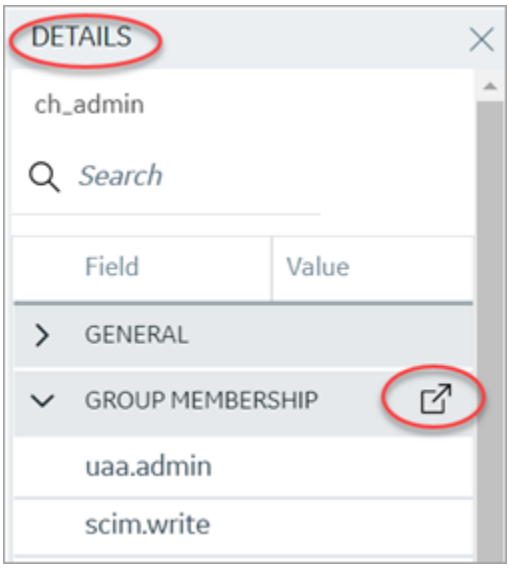
This topic describes how to modify group membership for existing user accounts.

Create Users *(on page 198)*

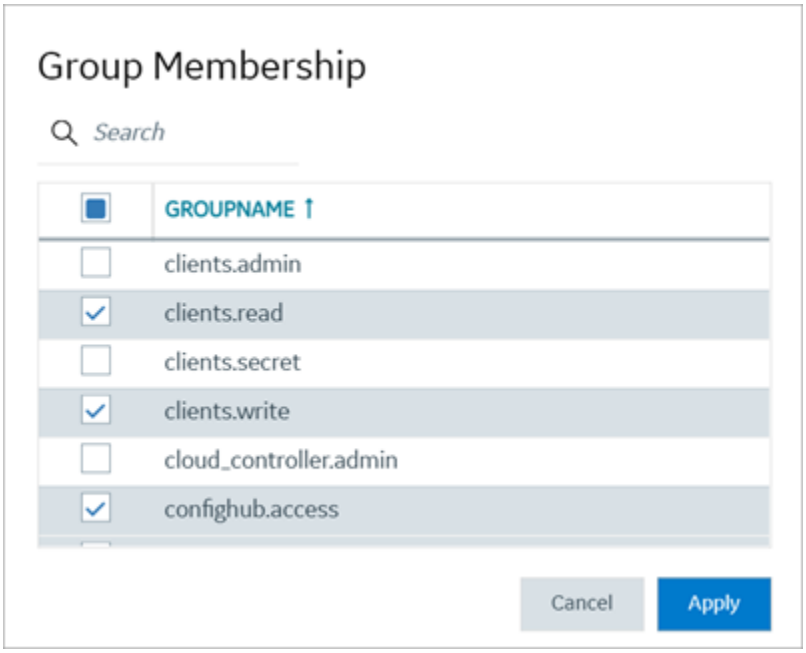
While it is possible to assign multiple scopes/groups to clients and users, it is advisable to exercise caution and follow these recommendations:

- **Adhere to the principle of least privilege**: Applying this principle helps to minimize potential security risks. It advocates to grant users only the necessary privileges and permissions to perform their tasks effectively. If you assign too many scopes to users, it can lead to unnecessary privileges, thus increasing the attack surface and potential for unauthorized access.
- **Keep the token size within acceptable limits**: The size of an Access token or JWT (JSON Web Token) commonly used for authentication and authorization purposes, can vary depending on the number of scopes assigned to a user. If a user has an excessive number of scopes, the size of the JWT can become significant. As a result, when the user attempts to access an application, the HTTP requests made by the application to validate the token may get impacted. In case the default settings of the web server hosting the application has limitations on request size, then the request can get blocked or rejected if the token size exceeds the set limit.

1. Go to **Proficy Authentication > Security > Users**.
   The existing list of user accounts appear.
2. Select the user account for which you want to modify group membership.
   The existing information for the user appears on the **DETAILS** panel.
3. Select  next to the **GROUP MEMBERSHIP** section.



   The **Group Membership** screen appears.
4. Select the check box for the groups you want to add the user as a member.
   To remove a group, clear the check box.



Important:
Do not select the check box for `iqp.studioAdmin` group for any users or groups. As this group is for reserved purposes, make sure no user accounts or groups are assigned to this group to avoid runtime errors.

5. Select **Apply**.

The groups are added (or removed from) for the user.

Note:
If a logged-in user attempts to remove his/her own scopes/groups, the remove operation may fail and result in an error: `Error while assigning the group`. In such instances, the user should log out of the Configuration Hub application and log-in again. We recommend that logged-in users should avoid removing their own scopes.

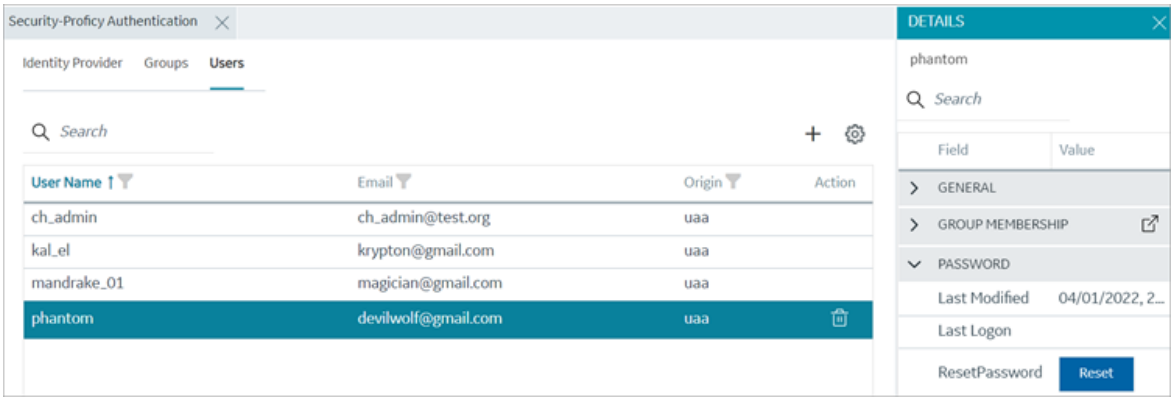
Reset User Password

This topic describes how to reset passwords for Proficy Authentication users.

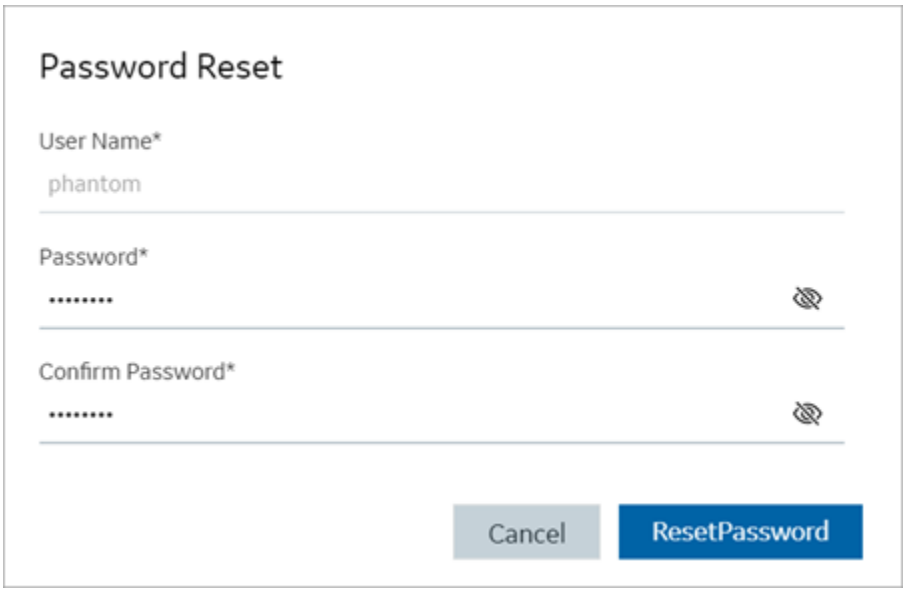
Log in to Configuration Hub as an administrator.

1. Go to **Proficy Authentication > Security > Users**.
   The existing list of user accounts appear.

2. Select the user account for which you want to reset the password.
   The option to reset password appears on the **DETAILS** panel under the **PASSWORD** section.



3. Select **RESET**.
   The **Password Reset** screen appears.
4. Enter the new **Password** and **Confirm Password** for the user account.



5. Select **Reset Password** to apply the changes.

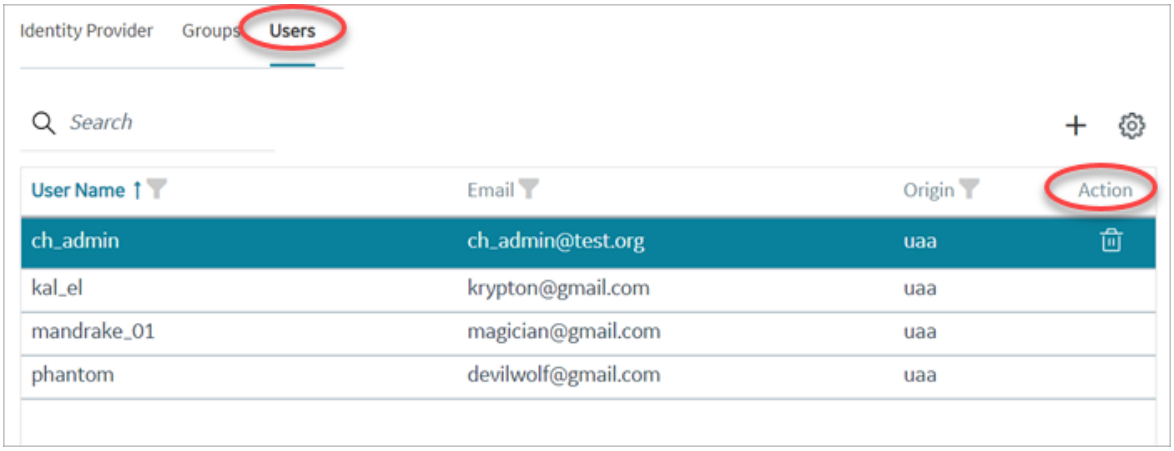
The password is reset for the user.

Delete User

This topic describes how to delete Proficy Authentication user accounts.

Log in to Configuration Hub as an administrator.

1. Go to **Proficy Authentication > Security > Users**.
   The existing list of user accounts appear.
2. Select the user you want to delete.
   Delete option appears in the **ACTION** column.



3. Select  .
   A message appears to confirm the delete action.
4. Select **Delete**.

The user account is deleted from the Proficy Authentication database.

Windows Integrated Authentication / Auto-login

Windows Integrated Authentication is a new capability added to Proficy Authentication Service from version 2022.

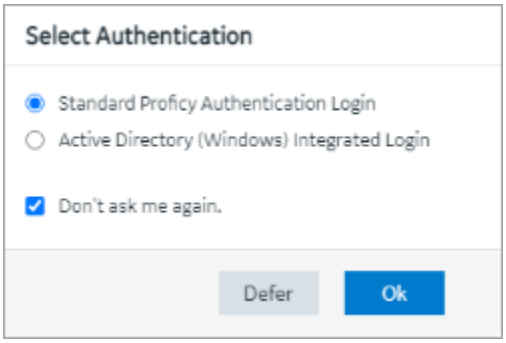
When Windows Integrated Authentication or Auto-login is enabled, users logged into any Windows machine in a domain are able to access Operations Hub and/or hosted Proficy applications without the need to type in their Windows credentials again. The same Windows logged-in user context is used for authenticating the user. Based on the user's privileges, access is provided to Operations Hub and/or its hosted applications.

This document describes the steps to configure the 'Windows Integrated Authentication' functionality in an instance of Proficy Authentication service. After configuring auto-login, when you attempt to log into Operations Hub / hosted Proficy applications, the **Select Authentication** screen appears (see figure below) to choose between `Standard Proficy Authentication Login` or `Active Directory (Windows) Integrated Login`.

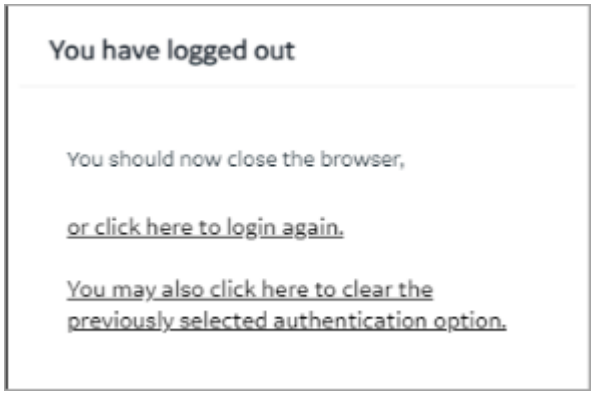
If you choose `Active Directory (Windows) Integrated Login`, the authentication option will follow the new flow and you will not be prompted for providing credentials. Whereas choosing `Standard Proficy Authentication Login` will take you through the normal authentication flow and prompt for your credentials.

Note:

- The auto-login capability is only for authenticating the users. For authorization or access permissions, you have to configure LDAP IDP. To accomplish this, select the same active directory service / LDAP server, which brings the authentication service node, application accessing nodes in the network, and the users seeking auto-login, into the same Windows scope.
- For configuring LDAP IDP, refer to Add LDAP Identity Provider *(on page 146)*.



Standard Proficy Authentication Login	Choose this option if you want to use the standard login (username/password or SAML). This is a regular login, which is based on username/password, including LDAP, or SAML.
Active Directory (Windows) Integrated Login	This option appears only if Windows auto-login is configured. This allows to automatically log into Operations Hub using the user's domain login session that was used to log in to Proficy Authentication.
Don’t ask me again	Select this check box, if you don't want to display the **Select Authentication** screen every time you login. The system remembers the last selected authentication (between regular and autologin) and applies it for future logins.

	With **Don't ask me again** enabled, you can clear the last selected authentication only during logout.  Select **You may also click here to clear the previously selected authentication option** to clear the saved selection. Once cleared, the clearing option is hidden from the logout screen. Select **click here to login again** to return to the login page.
Defer	Select to dismiss this screen, and skip selecting an authentication. You have the choice to select authentication next time you login.

To configure Windows Auto-login, an administrator performs the following tasks only for the first time. The first task is performed on all the participating nodes (Active Directory service node, Proficy Authentication service node, and the client nodes). The second and third are performed on the Windows Active Directory Server machine. The fourth task is performed on the machine where Proficy Authentication is installed.

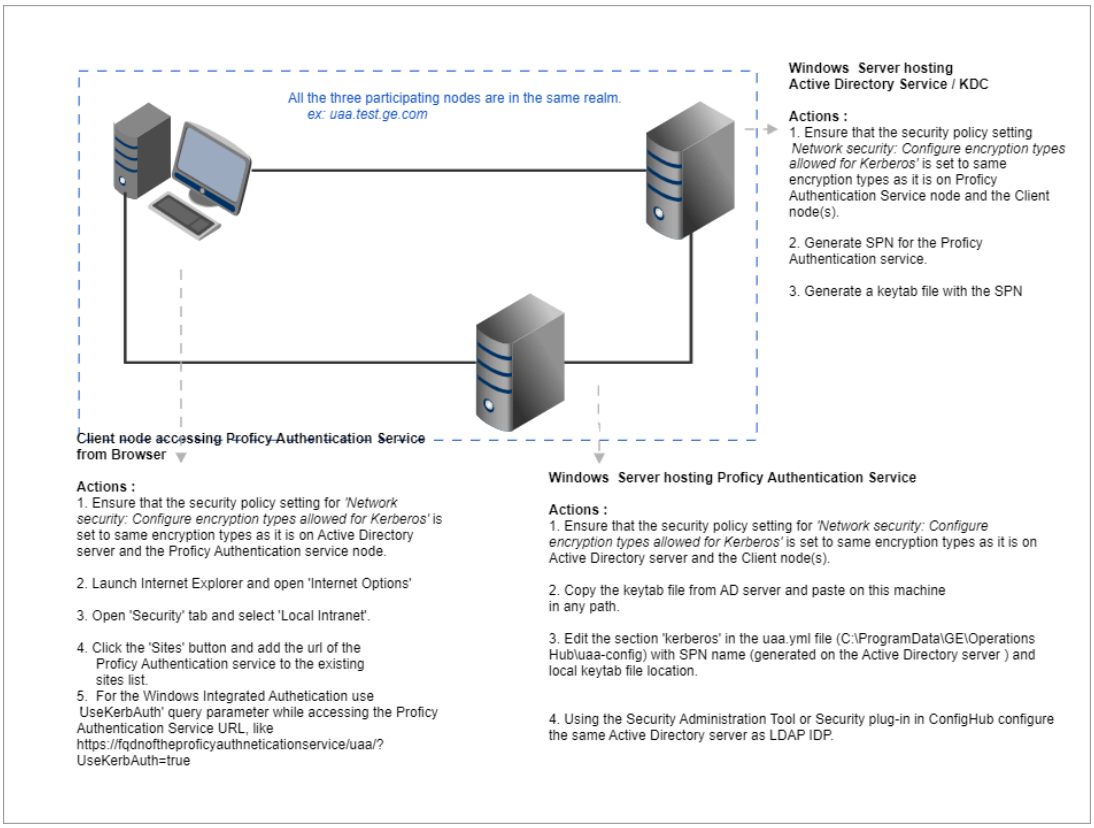
1. Configure Security Policy *(on page 207)*.
2. Create a service principal for your user account *(on page 209)*.
3. Generate the Kerberos keytab file *(on page 212)*.
4. Update the Proficy Authentication .yml file *(on page 215)*.
5. Add LDAP Identity Provider *(on page 146)* for the Active Directory service used in Steps 2 and 3.

> **Note:**
> Users logging into DPM products using Windows Auto-login are authorized / get the scopes based on the LDAP configuration performed in Step 5.

To configure the browser settings for Windows Auto-login, the following task is performed on the end-user machine.

- Configure the browser settings for Kerberos authentication *(on page 216)*.

Figure 1. Windows Auto-login - Deployment Topology and Configuration



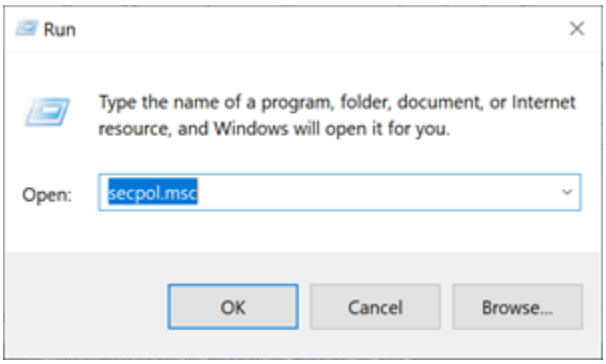
Configure Security Policy

This topic describes how to configure security policy setting associated to Kerberos authentication.

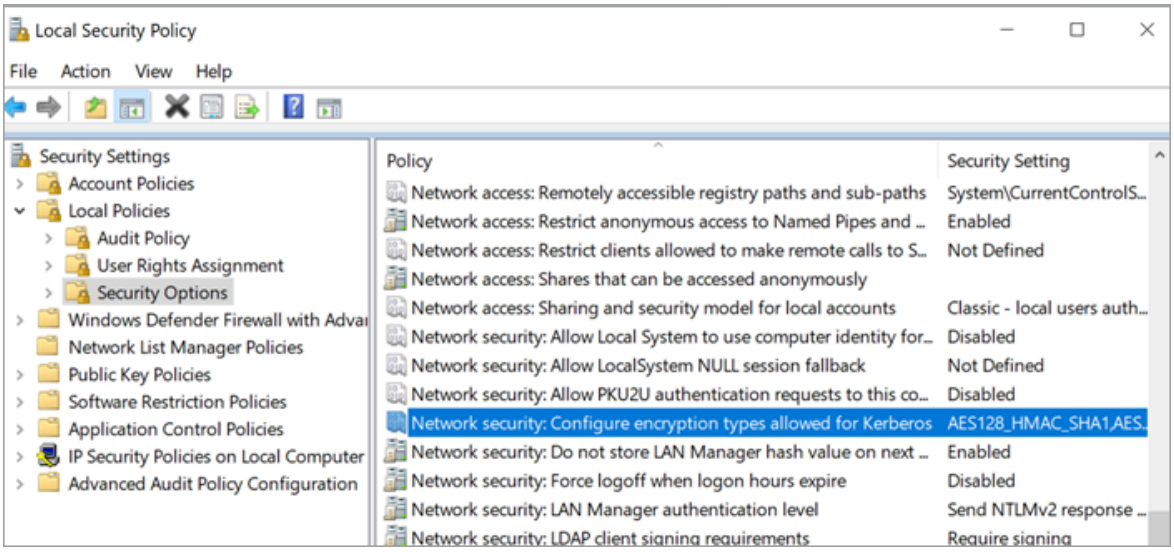
It is possible that you may not have access to your computer's local security policy settings, if it is governed by a group policy (controlled by your domain administrator). In any case, make sure that these security options are enabled for your computer.

If your environment is not governed by a group policy, then follow these steps to configure local security policy:

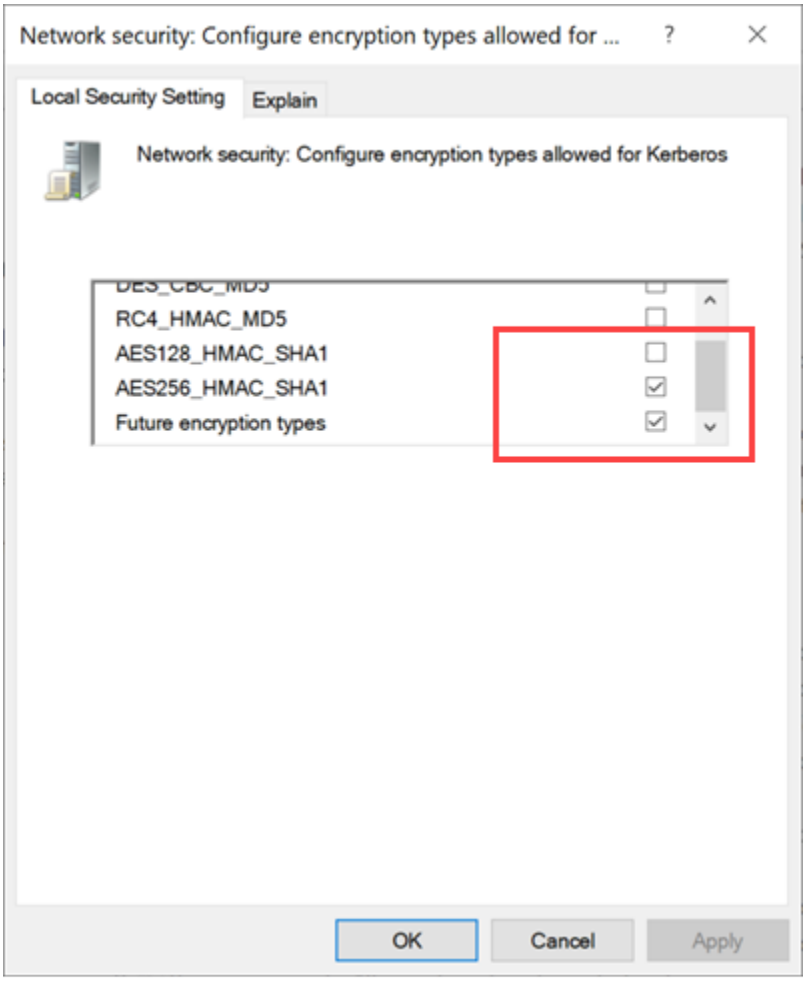
1. To access Local Security Policy, enter `secpol.msc` in Windows Run dialog and select **OK**.



2. Navigate to **Security Settings > Local Policies > Security Options**.



3. Double-click and open `Network security: Configure encryption types allowed for Kerberos` security policy setting.
4. Select the valid encryption types that you want to use as shown in the figure. Ensure that the selection is same across all the participating nodes.
   You can select either `AES128_HMAC_SHA1` or `AES256_HMAC_SHA1` as the encryption type. Also select the `Future encryption types` option.



Note:

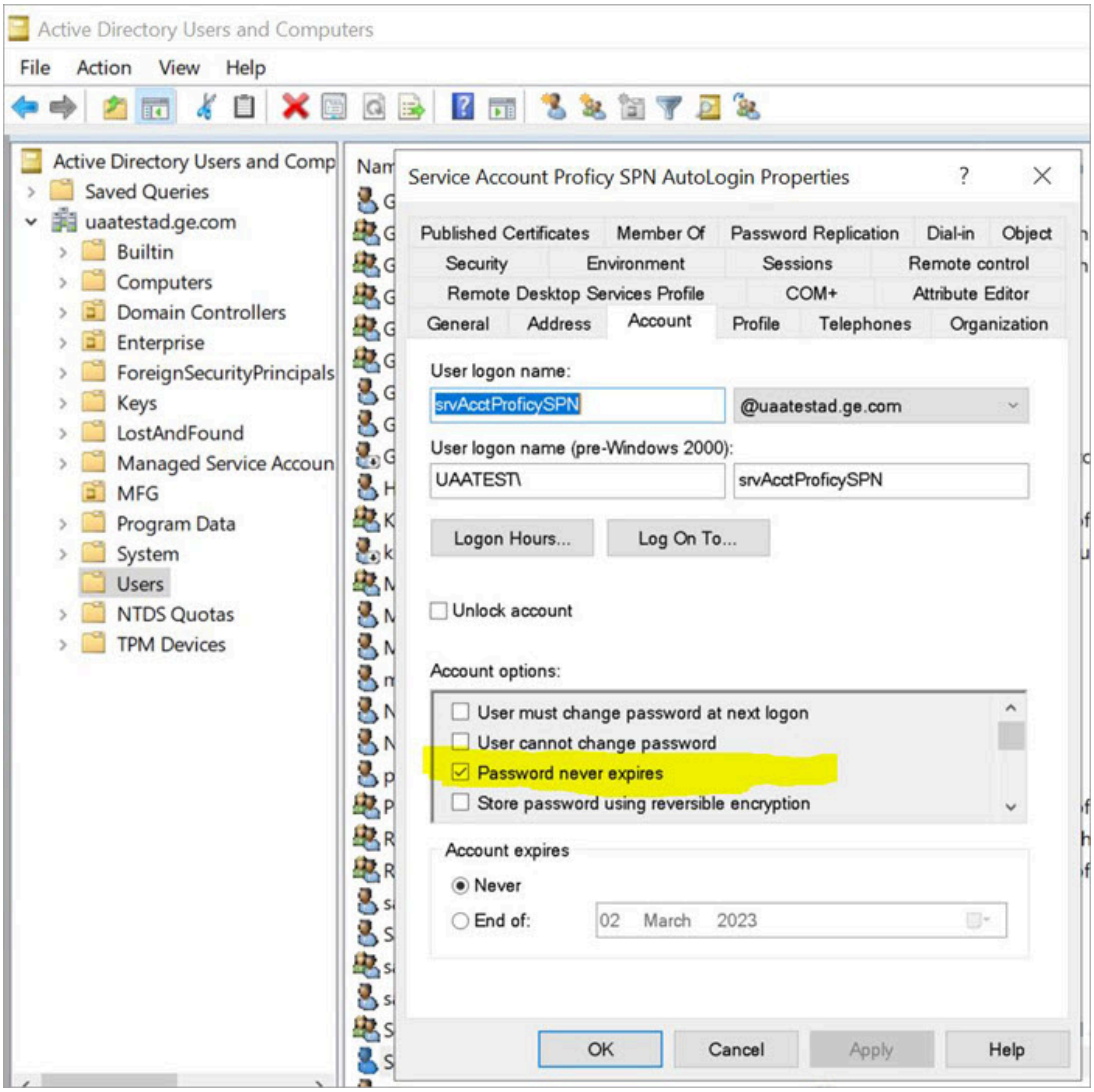
In our current documentation, we use `AES256_HMAC_SHA1` encryption type in our example code to generate the keytab file *(on page 212)*.

For more information refer to Microsoft documentation on security policy settings.

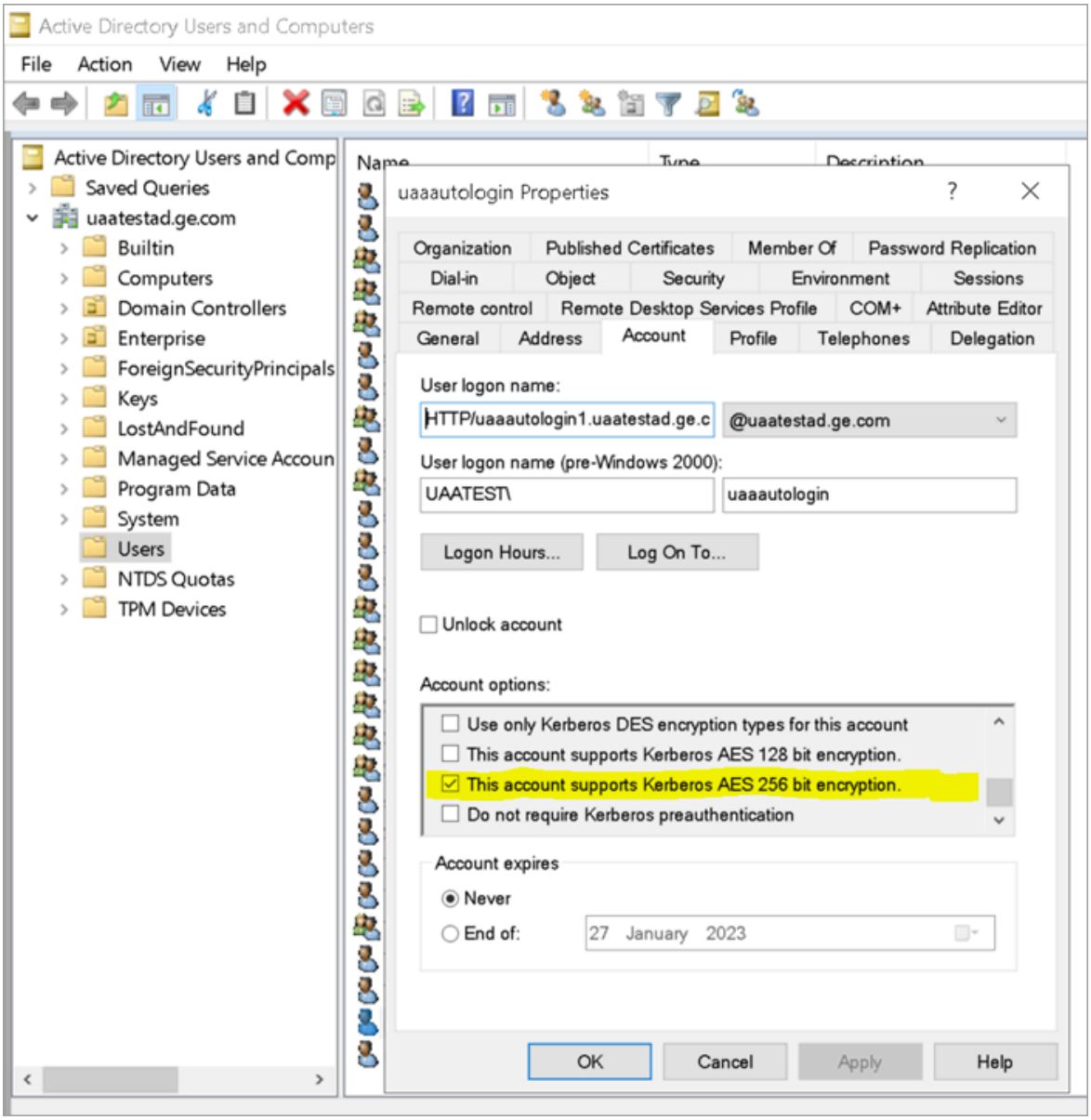
Create Service Principal Name

This topic describes how to create a service principal name.

- Create a managed service user account on the Active Directory Server node to represent the Proficy Authentication application in the active directory registry. Make sure to implement these settings for the account:
  - It is mandatory user is a member of the domain user group. Refer to Microsoft documentation for more information.
  - Set the account password to never expire. To do so, access the domain user account properties dialog: **Account > Account options > Password never expires**.



- Configure Security Policy *(on page 207)*



Note:
Delete existing SPNs, if any. Refer to Useful SPN commands *(on page 257)*.

You must be an administrator to perform this task.

1. Log in to the machine where Proficy Authentication is installed.
2. Open the Windows Command Prompt application.

3. Run the following command replacing with the appropriate code: `setspn -S HTTP/<FQDN> <user account>`

Code	Replace With
`<FQDN>`	Fully Qualified Domain Name (FQDN) of the server on which Proficy Authentication service is running. For example, `HTTP/phantomhost.uaatestad.ge.com@UAATESTAD.GE.COM` **Note:** These should be in capital letters: ◦ `HTTP` ◦ `UAATESTAD.GE.COM` (the domain name that follows @)
`<user account>`	Dedicated managed service user account created for Proficy Authentication service. For example, `ghost1`.

   Based on the above examples, your code should look like this: `setspn -S HTTP/phantomhost.uaatestad.ge.com@UAATESTAD.GE.COM ghost1`

The service principal name (SPN) is created.

Generate Keytab File *(on page 212)*

Generate Keytab File

Generate the Kerberos keytab file.

Create Service Principal Name *(on page 209)*

You must be an administrator to perform this task.

1. Log in to your system and open the Windows Command Prompt application.
2. Run the following command replacing with the appropriate code: `ktpass -out <filename> -princ HTTP/<service pincipal name> -mapUser <user account> -mapOp set -pass <password> -crypto AES256-SHA1 -pType KRB5_NT_PRINCIPAL`

Code	Replace With
`<filename>`	Name of the keytab file. **Note:** Keytab file name can be any given name. The file is created at the default location. You also have the option to specify an absolute path for file creation. For example, `-out c:\Documents\myskullcave.keytab`.
`<service pincipal name>`	Enter the service principal name that was created in the following format: `HTTP/phantomhost.uaatestad.ge.com@UAATESTAD.GE.COM`
`<User account>`	Enter the same managed service user account that was used during creating the service principal name. For example, `ghost1`. **Note:** If you want to use a different user account, delete the existing user account, (or) rename the **logon name** in the user account.
`<password>`	Proficy Authentication managed service user account password.
`AES256-SHA1`	Encryption algorithm you want to use. **Note:** GE recommends `AES256-SHA1`. But you can also use `AES128-SHA1`.
`KRB5_NT_PRINCIPAL`	Encryption type you want to use.

If the keytab is successfully created, the log should look something like this:

```
C:\Users\Administrator>ktpass -out c:\Temp\SACHINJOHUB21VM.uaatestad.ge.com.keytab -princ
 HTTP/SACHINJOHUB21VM.uaatestad.ge.com@UAATESTAD.GE.COM -mapUser Mark -mapOp set -pass Gei321itc -crypto
 AES256-SHA1 -pType KRB5_NT_PRINCIPAL
Targeting domain controller: uaatestad.uaatestad.ge.com
```

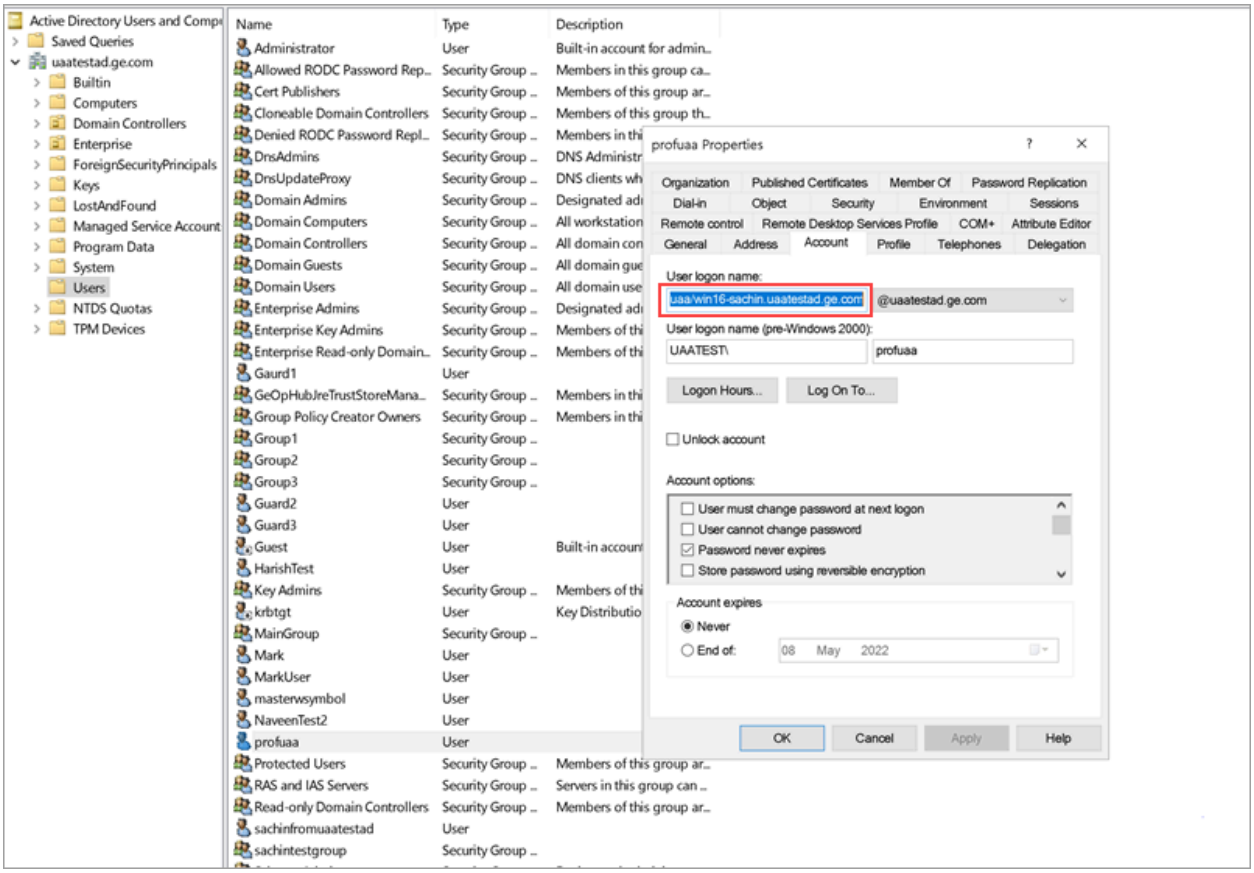
```
Using legacy password setting method
Successfully mapped HTTP/SACHINJOHUB21VM.uaatestad.ge.com to Mark.
Key created.
Output keytab to c:\Temp\SACHINJOHUB21VM.uaatestad.ge.com.keytab:
Keytab version: 0x502
keysize 105 HTTP/SACHINJOHUB21VM.uaatestad.ge.com@UAATESTAD.GE.COM ptype 1 (KRB5_NT_PRINCIPAL) vno 3 etype 0x12
 (AES256-SHA1) keylength 32 (0x3fb2a2824864a6b3617bfa4a6458af83534efdb8a3eac08b02316cce9c4ee7fc)
```

Example of a failed log:

```
C:\Windows\system32>ktpass -out c:\Temp\win16-sachin.uaatestad.ge.com.keytab -princ
 HTTP/sachin.uaatestad.ge.com@UAATESTAD.GE.COM -mapUser John -mapOp set -pass Gei321itc -crypto AES256-SHA1
 -pType KRB5_NT_PRINCIPAL
Targeting domain controller: uaatestad.uaatestad.ge.com
Using legacy password setting method
Failed to set property 'userPrincipalName' to 'HTTP/sachin.uaatestad.ge.com@UAATESTAD.GE.COM' on Dn
 'CN=John,CN=Users,DC=uaatestad,DC=ge,DC=com': 0x13.
WARNING: Failed to set UPN HTTP/sachin.uaatestad.ge.com@UAATESTAD.GE.COM on
 CN=John,CN=Users,DC=uaatestad,DC=ge,DC=com.
kinits to 'HTTP/sachin.uaatestad.ge.com@UAATESTAD.GE.COM' will fail.
Successfully mapped HTTP/sachin.uaatestad.ge.com to John.
Key created.
Output keytab to c:\Temp\win16-sachin.uaatestad.ge.com.keytab:
Keytab version: 0x502
keysize 102 HTTP/sachin.uaatestad.ge.com@UAATESTAD.GE.COM ptype 1 (KRB5_NT_PRINCIPAL) vno 9 etype 0x12
 (AES256-SHA1) keylength 32 (0x8b551a22050935e9ace848cacbacc86a4eb845e63b6461d4f31b7d815158cf6c)
```

You can also do the following to verify if the service principal is mapped to the managed service user account, and a keytab is created:

1. Go to **Active Directory Users and Computers > Users**.
2. Access the properties of the user account for which you created the keytab file.
3. On the **Account** tab, verify **User logon name**. is pointing to your service principal name.



- Copy the keytab file on the machine, where Proficy Authentication is installed.
- Update the Proficy Authentication uaa.yml file *(on page 215)*.

Proficy Authentication Service Configuration

This topic provides steps to update the Proficy Authentication `uaa.yml` file.

Make sure you have completed the following tasks:

- Generate Keytab File *(on page 212)*.
- Copy the keytab file from the Active Directory server, and paste it anywhere on the Proficy Authentication machine.
- Make a note of the keytab file location on the Proficy Authentication machine.

You must be an administrator to perform this task.

1. Log in to the computer machine where Proficy Authentication is installed.
2. Access the `uaa.yml` file.
   The file is located at `C:\ProgramData\Proficy\Operations Hub\uaa-config\uaa.yml`

3. To modify, open `uaa.yml` in any text editor.
   Example: Notepad++
4. Search for `kerberos` and enter values for the following keys:

service-principal	Enter the service principal name. For more information, refer to Create Service Principal Name *(on page 209)*.
keytab-location	Enter the location path where you copied the keytab file on this machine.

   For example:

```
kerberos:
    service-principal: HTTP/phantomhost.uaatestad.ge.com@UAATESTAD.GE.COM
    keytab-location: 'file:///C:/ProgramData/GE/Proficy Authentication/uaa-config/myskullcave.keytab'
```

5. Save and close the modified file.
6. Restart the `GE Proficy Authentication Tomcat Web Server` service.
   a. Access the Windows Run dialog.
   b. Enter `services.msc` to open the **Services** screen.
   c. Right-click `GE Proficy Authentication Tomcat Web Server` and select **Restart**.

The Proficy Authentication service configuration is updated .

Configure Browser

Configure the browser settings for Kerberos authentication.

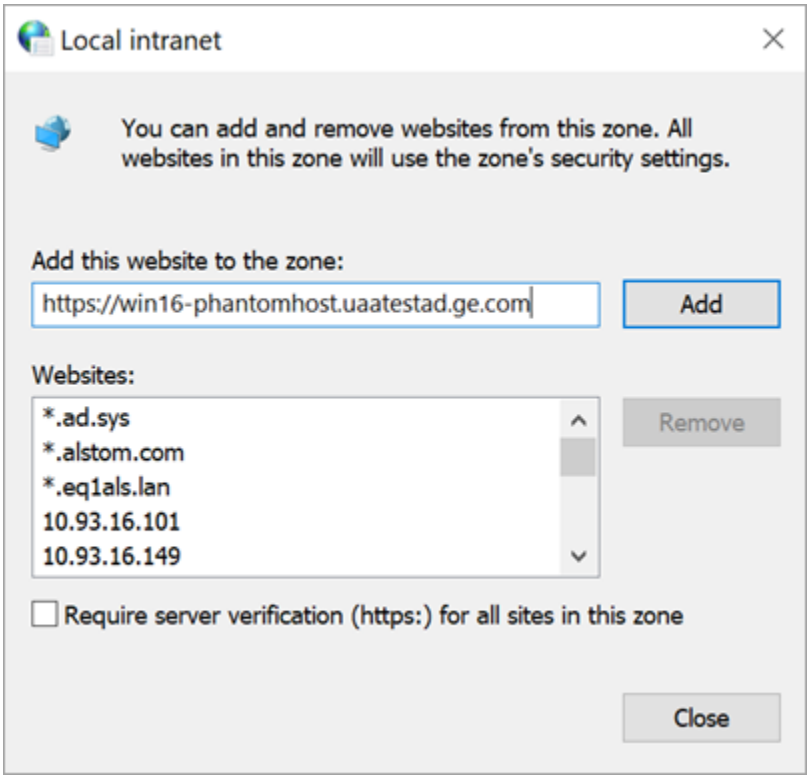
Windows Auto-login works if the following tasks are accomplished.

- Create Service Principal Name *(on page 209)*
- Generate Keytab File *(on page 212)*
- Proficy Authentication Service Configuration *(on page 215)*

The steps describe how to configure the browser settings on Internet Explorer (IE). Since IE settings are shared by Chrome, you do not have to configure it separately for the Chrome browser.

Important:
Windows Auto-login is not supported on the node where the Proficy Authentication service is running. To enable auto-login, configure the browser settings on a node different from the Proficy Authentication service node.

1. Go to **Control Panel > Internet Options**
   The **Internet Properties** dialog appears.
2. On the **Security** tab, select **Local intranet > Sites**.
   The **Local intranet** window appears.
3. Select **Advanced**.
4. In **Add this website to the zone**, enter the URL of the Proficy Authentication service, and then select **Add**.



5. Select **Close**.
6. Select **OK** to close the open windows.

Kerberos supported SPNEGO authentication is enabled on your IE browser.

For Windows Auto-login, use `UseKerbAuth` query parameter while accessing the Proficy Authentication service URL. For example, `https://FQDN of the Proficy Authentication Service Node/uaa/?UseKerbAuth=true`

Example Configuration for Multi-domain and Auto-login Functionality

This topic describes how to set up the auto-login with multi-domain functionality so that users can automatically log in to multiple domains without having to enter their credentials for each domain login.

You should have administrative access to perform the steps described below. You need virtual machines (VM servers) to host the following:

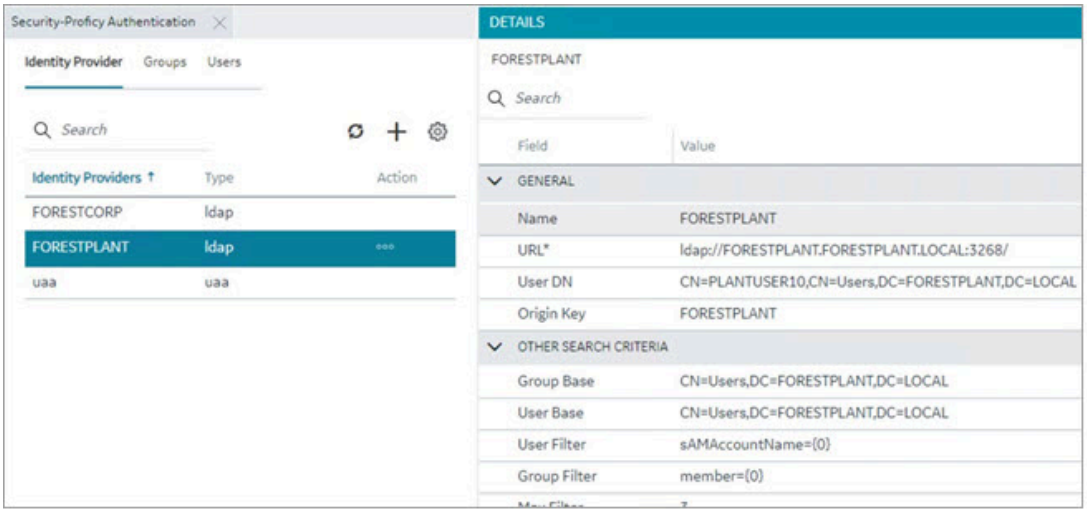
- Forest1 VM server named FORESTPLANT in this topic.
- Forest2 VM server named FORESTCORP in this topic.
- VM server where Proficy Authentication is installed, and can also be utilized for testing purposes.
- However in this topic, we use a separate VM server for testing auto-login with multi-domain functionality.

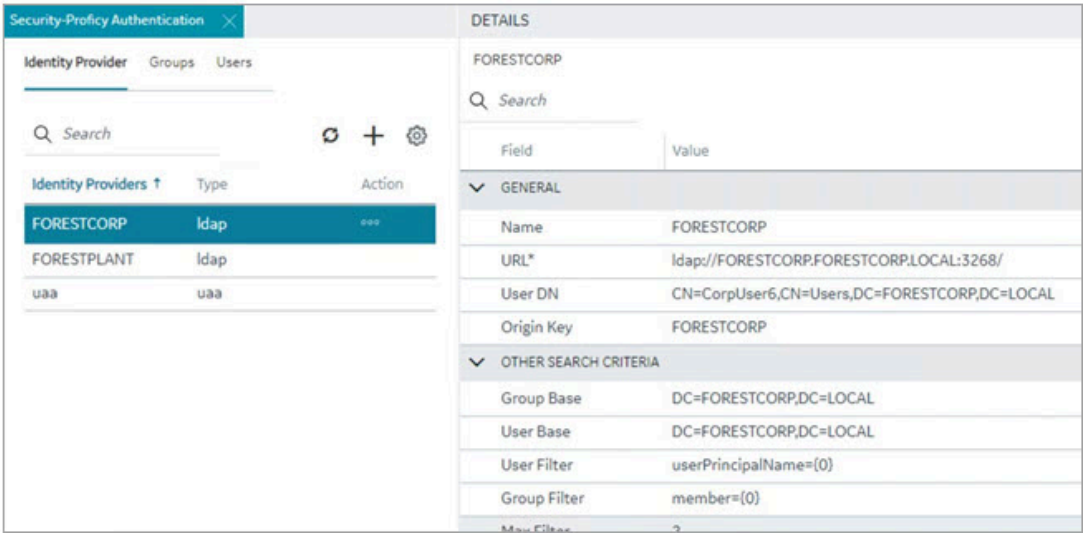
Benefits of Auto-login with multi-domain functionality:

- eliminates the need for users to remember and enter separate user names and passwords for each domain.
- seamless user experience by automatically logging them across multiple domains with a single authentication event.
- users can save time and effort by avoiding repetitive login procedures.
- while auto-login simplifies the login process, it can also enhance security. It allows for the use of stronger, complex passwords since users don't need to remember them. It reduces the risk of password reuse or weak passwords, which are common security vulnerabilities.

1. Identify the domains where you want to enable auto-login with multi-domain functionality. We shall use the following domains:
    - FORESTPLANT
    - FORESTCORP
2. Create a domain trust between FORESTPLANT and FORESTCORP.
   You can refer to the following links for more information.
    - https://www.youtube.com/watch?v=F7DgXAXNnC8
    - How trust relationships work for forests in Active Directory
    - Understanding the Global Catalog
    - Global Catalog and LDAP Searches
    - Nesting groups
3. Log in to the VM server where you can access Proficy Authentication, and create two LDAP accounts, one for each Forest.
   Refer to Add LDAP Identity Provider *(on page 146)* for steps to create a LDAP account.
   While creating the LDAP accounts, make sure you do the following:

- For LDAP server URL address, use port `3268` if the global catalog is enabled. This port provides access to a broader range of directory information across multiple domains within the forest. For example: user attributes, group memberships, and other directory objects. In case the global catalog is not enabled, then use `389` or `636` ports.
- Include the Active Directory forest name in the URL. For example:
  - `ldap://ad1.forestplant.ge.com:3268/`
  - `ldap://ad2.forestcorp.ge.com:3268/`

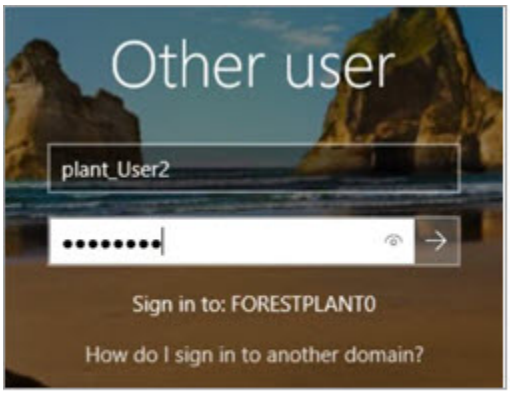




4. Log in to any one of the Active Directory forest, and perform the steps described in the following topics:
   a. Configure Security Policy *(on page 207)*
   b. Create Service Principal Name *(on page 209)*
   c. Generate Keytab File *(on page 212)*

d. Proficy Authentication Service Configuration *(on page 215)*
e. Configure Browser *(on page 216)*

5. Log in to the test VM and validate the trust relationship for authentication and accessing resources across multiple domains.



High Availability

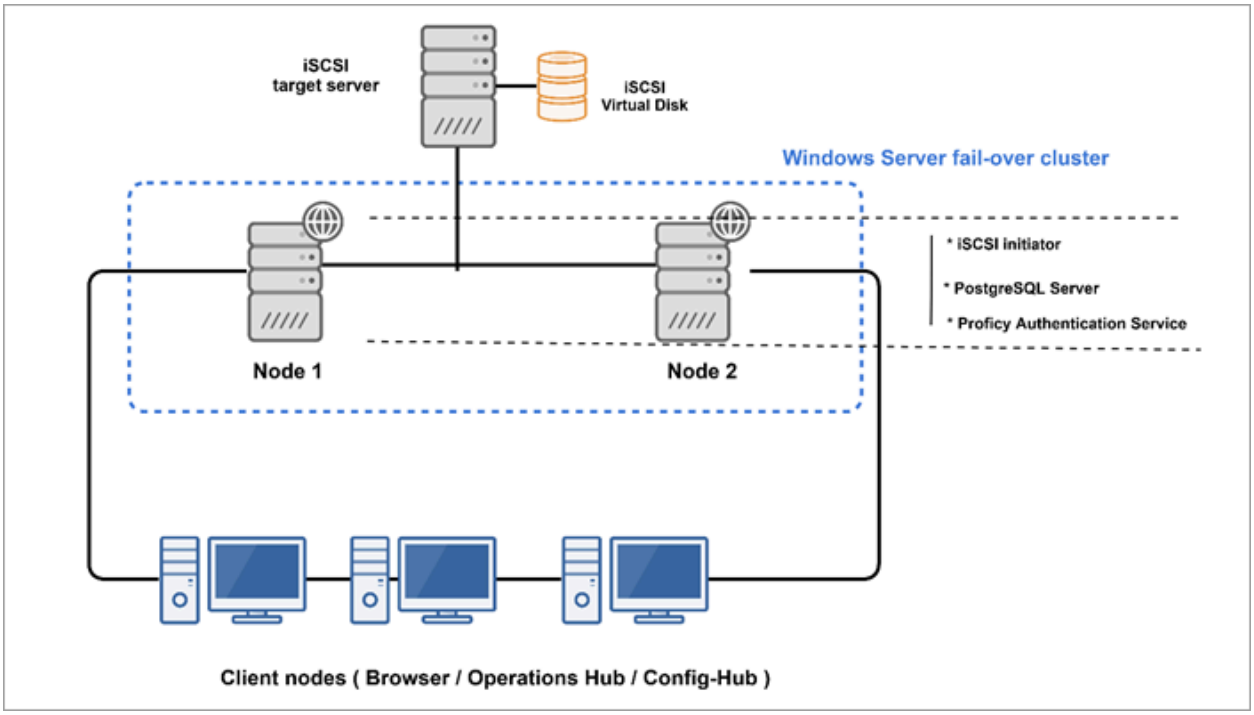
Configure High Availability for Proficy Authentication

This topic describes how to set up a highly available server for the Proficy Authentication service that is based on the Windows failover cluster and iSCSI technologies.

You need:

- One Windows Server 2019 virtual machine to serve as iSCSI Target.
- Two Windows Server 2019 virtual machines to serve as iSCSI Initiators:
  - A primary node (Node1) server
  - A secondary node (Node2) server

The following image illustrates the simplest form of deploying the Windows failover cluster and iSCSI technology-based high available solution for the Proficy Authentication Service.



In failover cluster technology, a group of independent computers work together to increase the availability and scalability of clustered roles (identified as nodes in a cluster). Nodes are clustered server machines running applications and services.

Failover cluster feature and file server roles are installed on the Node1 and Node2 servers (also called iSCSI initiators). A virtual disk is created on the iSCSI target server for shared storage. Failover clustering technology arranges for a backup server whenever the primary server has failed for any reason. So, if the primary server Node1 is down, then the backup server Node2 is automatically activated to replace the role of the primary server. This ensures uninterrupted access to shared storage and continuity of services even during failure of the primary server.

1. Set up the iSCSI Target.
    a. Configure iSCSI Target *(on page 222)*
    b. Create a Virtual Disk *(on page 225)*
2. Set up the iSCSI initiators: Node1 and Node2.
    a. Configure iSCSI Initiator *(on page 222)*
    b. Initialize a Virtual Disk *(on page 226)*
3. Open Failover Cluster Manager on any of the iSCSI initiator nodes in a cluster (Node1 or Node2), and create a cluster *(on page 228)*.
4. Create and configure a role for the failover cluster. See Configure Role *(on page 233)*.
5. Install Proficy Authentication on both the nodes.

See Configure Proficy Authentication Installation *(on page 238)*.

If you are installing Operations Hub in a highly available cluster, follow the steps as described in Prerequisites for Installing Operations Hub with External Proficy Authentication *(on page 243)*.

6. Restart the services on both the nodes.

Configure iSCSI Target

This topic describes how to configure an iSCSI target server.

You can configure an external storage using Windows 2019.

1. Log in to the virtual machine where you want to set up the iSCSI target server.
2. Go to **Start > Administrative Tools > Server Manager**.
3. From the Server Manager dashboard, select **Manage > Add roles and features**.
4. Complete **Add Roles and Features Wizard** with these options:

Section	What To Do
Before You Begin	Skip to the next section.
Installation Type	Select **Role-based or feature-based installation**.
Server Selection	a. Choose the option **Select a server from the server pool**. b. Under the server pool section, select your target server. You will be installing the role/feature on this server.
Server Roles	In the roles list box: a. Expand **File and Storage Services > File and iSCSI Services**. b. Select the check box for **iSCSI Target Server**.
Confirmation	Select **Install**.

When the installation is complete, restart the machine.

Log in to the same server again and create a virtual disk *(on page 225)*.

Configure iSCSI Initiator

This topic describes how to configure an iSCSI initiator and connect to the target server.

Configure iSCSI Target *(on page 222)*.

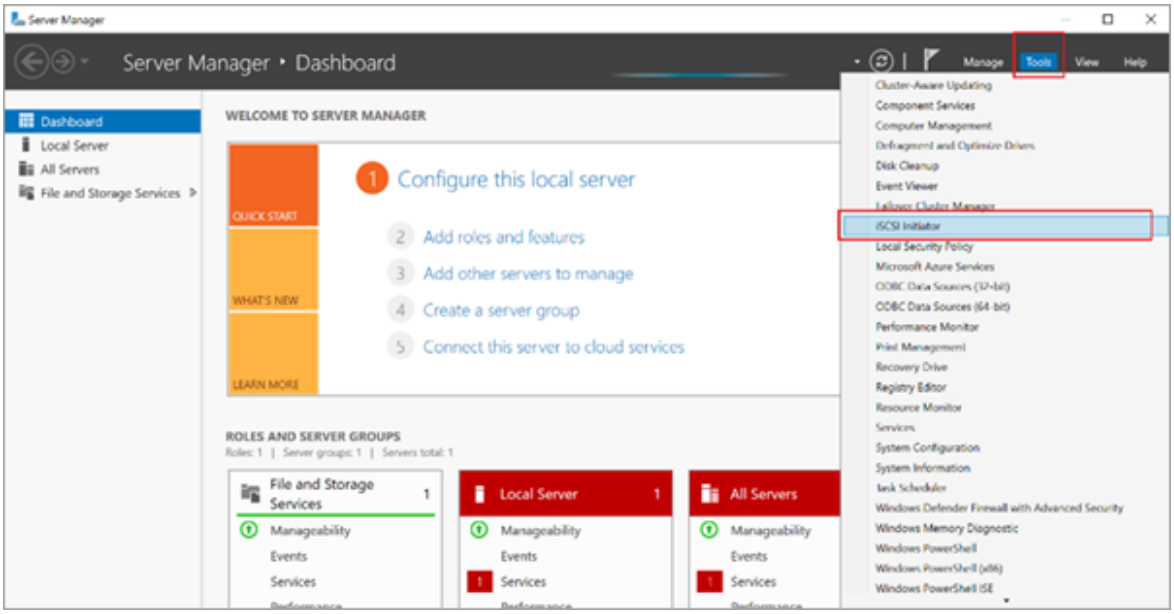
You must perform these steps on all the initiator server nodes you want to add to a cluster. Let us assume you are setting up a basic two-node cluster, where there are two iSCSI initiators:

- A primary server called Node1
- A secondary server called Node2

1. Log in to the Node1 server.
2. Go to **Start > Administrative Tools > Server Manager**.
3. From the Server Manager dashboard, select **Manage > Add roles and features**.
4. Complete **Add Roles and Features Wizard** with these options:

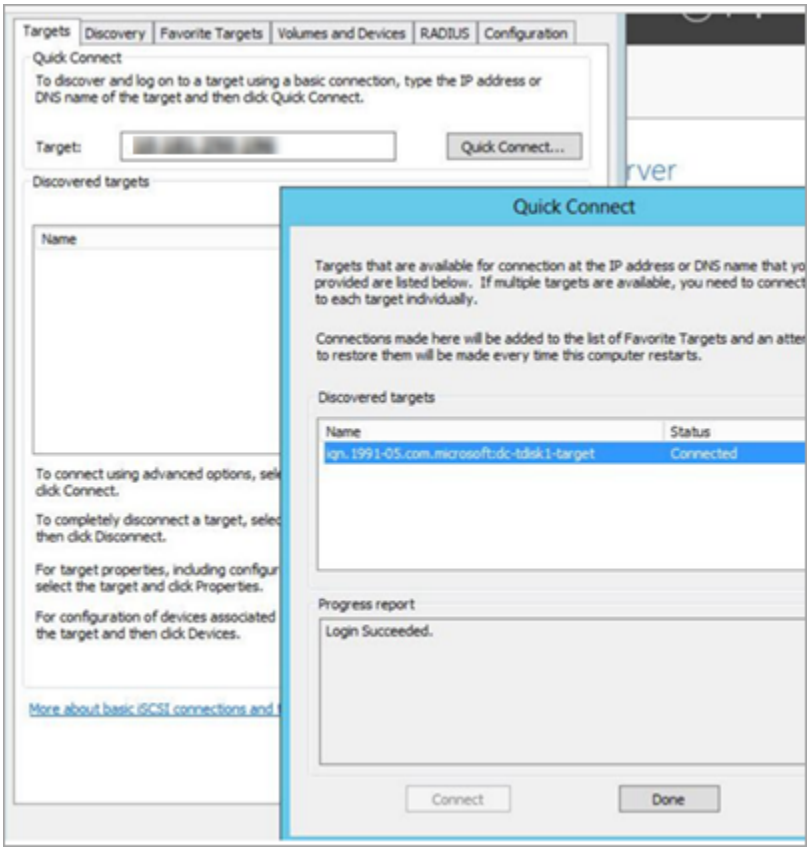
Section	What To Do
Before You Begin	Skip to the next section.
Installation Type	Select **Role-based or feature-based installation**.
Server Selection	a. Choose the option **Select a server from the server pool**. b. Under the server pool section, select your Node1 server. You will be installing the role/feature on this server.
Server Roles	In the roles list box: a. Expand **File and Storage Services > File and iSCSI Services**. b. Select the check box for **iSCSI Target Server**.
Features	To allow the installation of Failover Cluster Manager: a. In the features list box, select the check box for **Failover Clustering**. The **Add features that are required for Failover Clustering?** screen appears, which shows the dependencies that are installed with this feature. b. Select **Add Features**.
Confirmation	Select **Install**.

   The selected role and feature is installed on the Node1 server.
5. When the installation is complete, restart the machine.
6. Log in to the same server again and launch **Server Manager**.
7. From the **Tools** menu, select **iSCSI Initiator**.



8. In the **Target** field, enter the iSCSI target server address.
9. Select **Quick Connect**.

   If connected, the login success appears as shown in the following figure:



10. Select **Done**, then **OK** to exit.
11. Log in to the Node2 server and repeat steps 1-9.

Initialize a Virtual Disk *(on page 226)*

Create a Virtual Disk

This topic describes how to create an iSCSI virtual disk and configure the access server.

You must first configure the iSCSI target server *(on page 222)*.

1. Log in to the iSCSI target server.
2. Go to **Start > Administrative Tools > Server Manager**.
3. Go to **File and Storage Services > iSCSI**.
4. From the **TASKS** drop-down menu, select **New iSCSI Virtual Disk**.
5. Complete **New iSCSI Virtual Disk Wizard** with these options:

Section	What To Do
iSCSI Virtual Disk Location	The iSCSI target server and volume details are displayed.
iSCSI Virtual Disk Name	Enter a name for the virtual disk. For example, `sharedDisk`
iSCSI Virtual Disk Size	a. Enter the disk size. For example, `10GB`. The disk size depends on your database utilization and number of users. b. Select **Dynamically expanding**.
iSCSI Target	Select **New iSCSI target**. If the target is new, then it should be assigned later as described in step 8.
Target Name and Access	Enter a name for the iSCSI target server. For example, `hauaatarget`
Access Servers	Add the iSCSI initiators (Node1 and Node2) and enable them to access the iSCSI virtual disk. Follow these steps to add the servers one at a time: a. Select **Add**. The **Add initiator ID** screen appears. b. Select **Enter a value for the selected type**. c. From the **Type** drop-down menu, choose any of the following options to enter a value:

Section	What To Do
	▪ If you select **DNS Name**, enter the DNS name of the computer where the iSCSI initiator is installed. ▪ If you select **IP Address**, then enter the IP address of the computer where the iSCSI initiator is installed. ▪ If you select **Mac Address**, then enter the MAC address of the computer where the iSCSI initiator is installed. d. Select **OK** to exit. e. To add Node2, repeat the above steps.
Enable authentication	Skip to the next section.
Confirmation	Select **Create**.

When the iSCSI virtual disk is created successfully, select **Close** to exit the wizard.

6. In Server Manager, go to **File and Storage Services > iSCSI** and verify the newly created virtual disk is listed under iSCSI virtual disks.
   The virtual disk status appears as `Not Connected`. This occurs when a new iSCSI target is selected during iSCSI virtual disk creation.
7. Right-click the `Not Connected` iSCSI virtual disk and select **Assign iSCSI Virtual Disk**.
8. Complete **Assign iSCSI Virtual Disk Wizard** with these options:

Section	What To Do
iSCSI Target	Select **Existing iSCSI target** and select the target server to connect.
Confirmation	Select **Assign**.

When the iSCSI virtual disk is assigned successfully, select **Close** to exit the wizard.

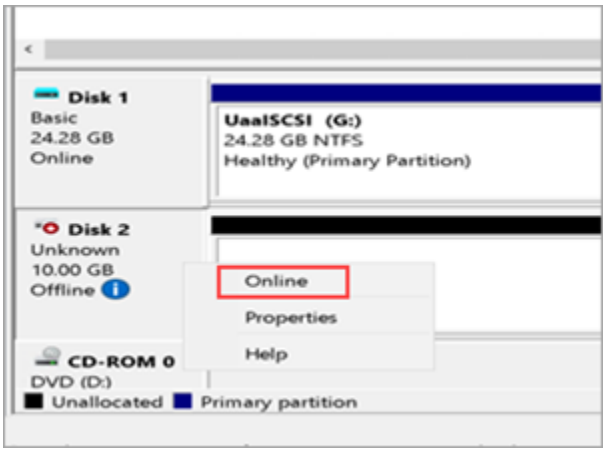
Initialize a Virtual Disk

This topic describes how to initialize a disk and create a volume.

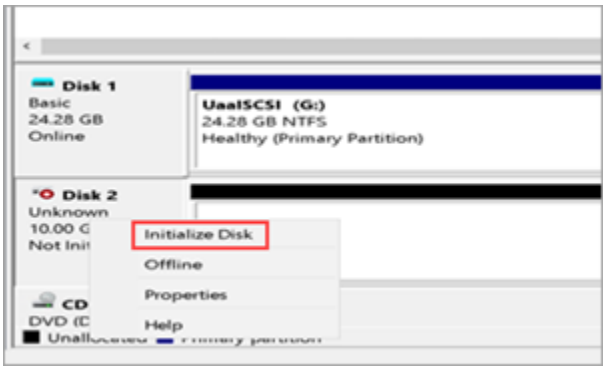
Create a Virtual Disk *(on page 225)*.

You need to perform the following tasks only once on any of the iSCSI initiator nodes and it applies to the other nodes in a cluster. Suppose there are two nodes in a cluster, Node1 and Node2. If you initialize a virtual disk on the Node1 server, then you don't need to do it again on the Node2 server.

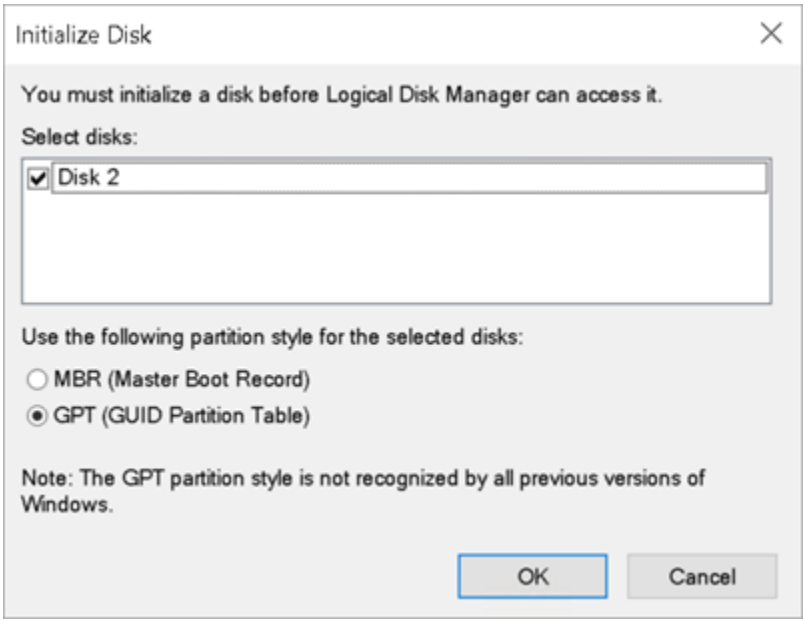
1. Log in to any of the server nodes in a cluster (Node1 or Node2).
2. Go to **Control Panel > Administrator Tools > Computer Management > Storage > Disk Management**.
3. Look for the unknown disk, right-click and select **Online**.
   If the unknown disk is offline, you must bring it online.



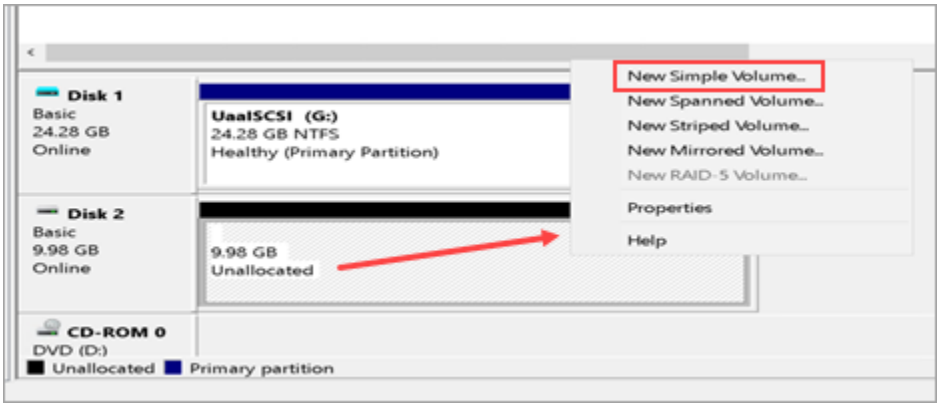
4. Right-click the unknown disk again and select **Initialize disk**.



   The **Initialize Disk** screen appears.
5. Select **OK**.



6. Right-click the unallocated space on the disk, and select **New Simple Volume**.



   The **New Simple Volume Wizard** screen appears.
7. Complete the steps in the wizard to create a new volume.

   You need to:

   - Specify the size of the volume you want to create in megabytes (MB).
   - Assign a drive letter to identify the partition.
   - Format the volume with default settings.

The newly created volume should appear under **This PC** on the logged-in machine.

Create a Cluster

This topic describes how to create a failover cluster.

Install Failover Cluster Manager on the iSCSI initiator nodes. Refer to steps 1-4 in Configure iSCSI Initiator *(on page 222)*.

You can perform these steps on either Node1 or Node2. Suppose you perform these steps on Node1, they are automatically applied to Node2.

1. Log in to the iSCSI initiator node.
2. Go to **Start > Administrative Tools > Failover Cluster Manager**.
3. In Failover Cluster Manager, select **Validate a Configuration**.
   Before starting to create a cluster of nodes, you should validate whether the nodes that you are adding to the cluster are compatible with the cluster hardware requirement. For more information, refer to the Microsoft documentation.
4. Complete **Validate a Configuration Wizard** with these options:

Section	What To Do
Before You Begin	Skip to the next section.
Select Servers or a Cluster	Browse and locate the servers you want to add to the cluster. Refer to Add Server Nodes for Validation *(on page 230)*.
Testing Options	Select **Run all tests (recommended)**.
Confirmation	Review the list of tests run on the selected servers. The number of tests run are based on the roles installed on the server nodes.
Validating	This process may take several minutes depending on your network infrastructure, and the number of server nodes selected for validation.
Summary	a. Select **View Report**. b. Review **Failover Cluster Validation Report** and fix any failed validations. You can ignore expected warnings. The validation report should be free of any errors, otherwise the cluster setup will not be successful. c. Select **Finish**.

5. In Failover Cluster Manager, select **Create a Cluster**.
6. Complete **Create Cluster Wizard** using these options:

Section	What To Do
Before You Begin	Skip to the next section.

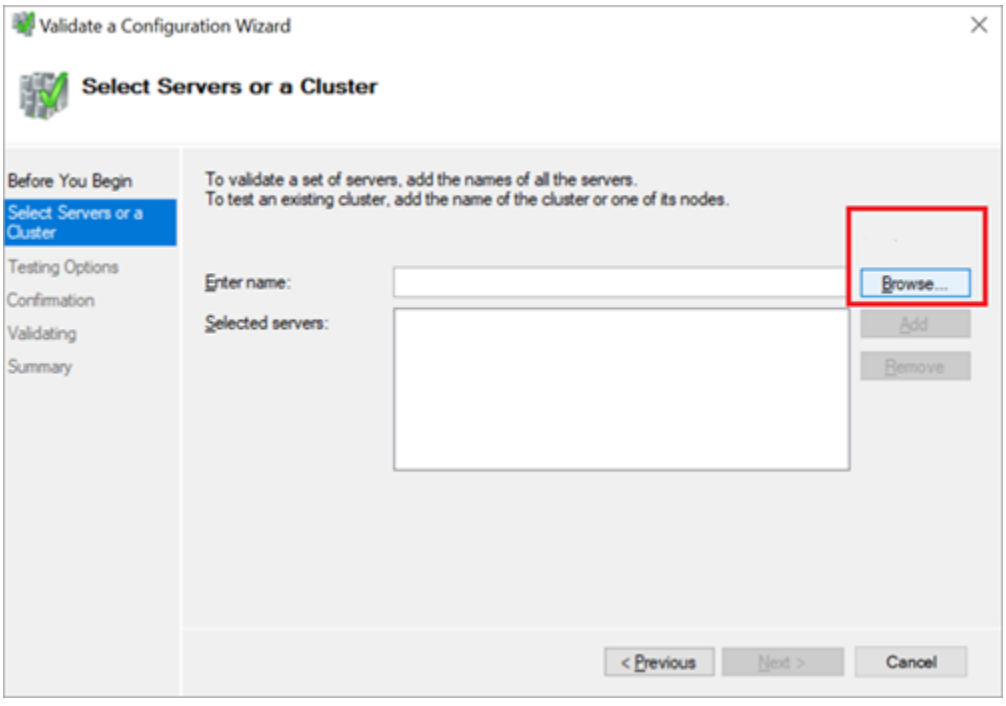
Section	What To Do
Select Servers	Nodes were already added during validating the configuration process.
Validation Warning	Select **No**.
Access Point for Administering the Cluster	Enter a unique name for your cluster. For example, `hauaacluster`
Confirmation	Clear the check box for **Add all eligible storage to the cluster**.
Creating New Cluster	This process may take a while as there are several checks that must be run, and tests that are conducted while the system is configured.
Summary	Select **Finish**.

Add Server Nodes for Validation

This topic describes how to select computers during validating a cluster configuration.

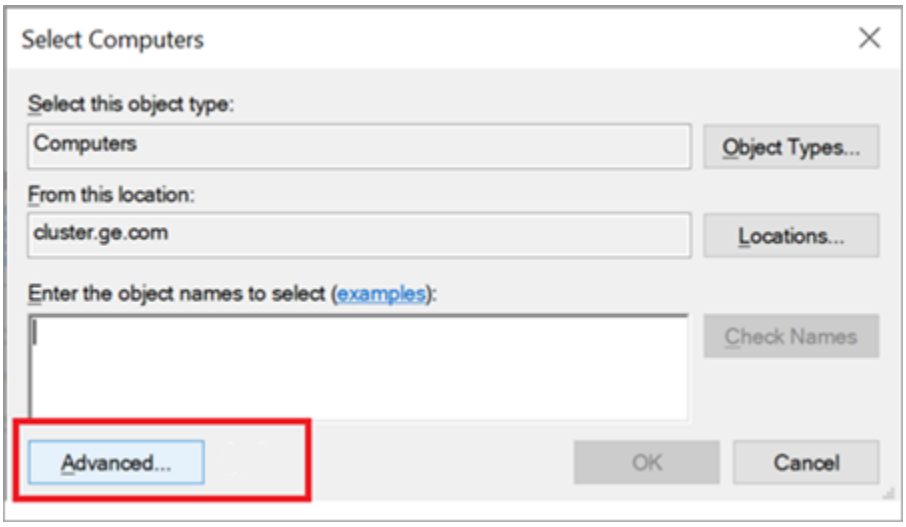
In the following steps, `UAAHANODE1` (Node1 server name) and `UAAHANODE2` (Node2 server name) are used as example server nodes in a cluster.

1. On the **Select Servers or a Cluster** tab, select **Browse**.

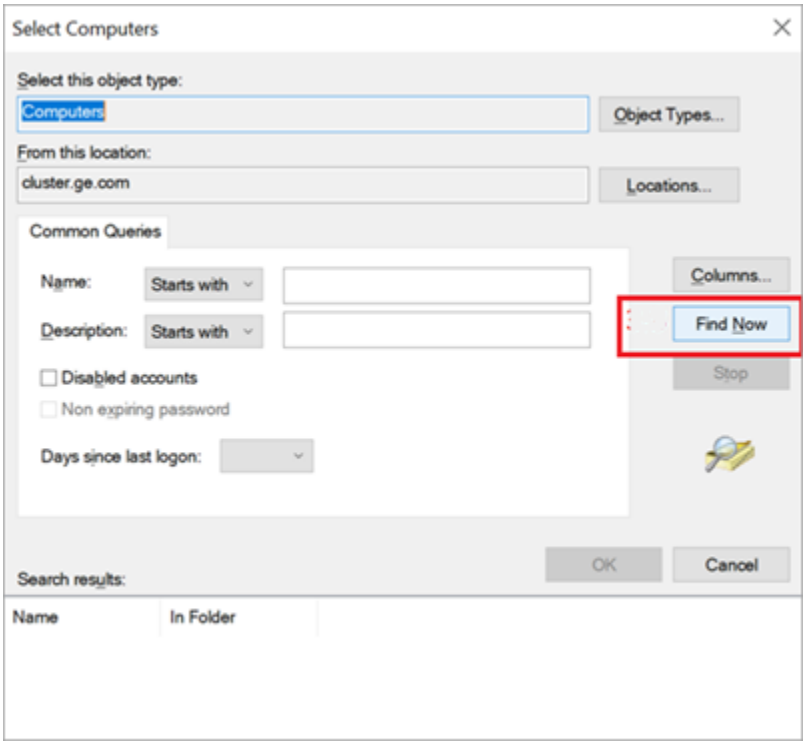


   The **Select Computers** screen appears.

2. Select **Advanced**.

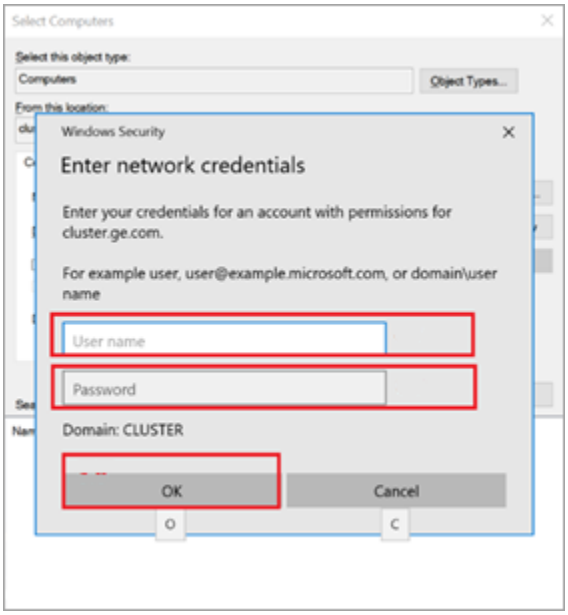


3. Select **Find Now**.



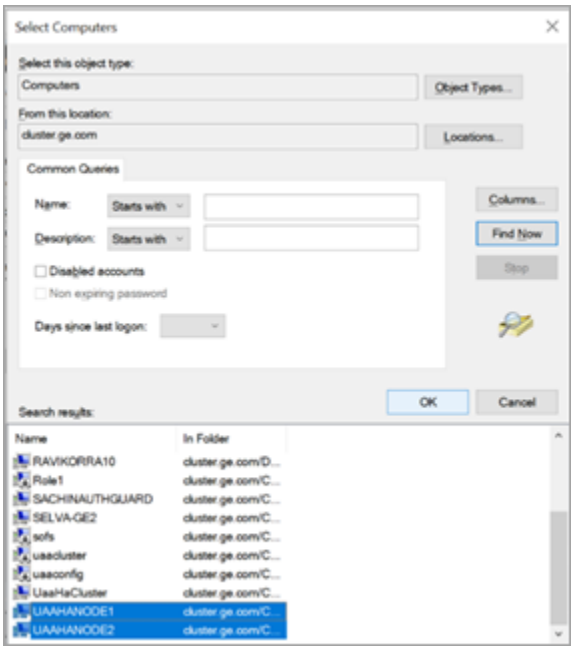
A screen appears prompting to enter the network credentials.

4. Enter the user name and password of the domain where the cluster validation is being performed, and select **OK**.

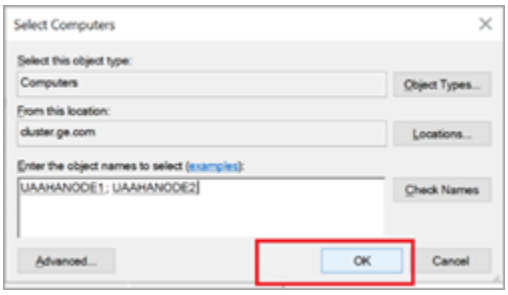


After successful login, you can see the associated nodes.

5. Select `UAAHANODE1` and `UAAHANODE2`, and select **OK**.



6. Select **OK** to exit.



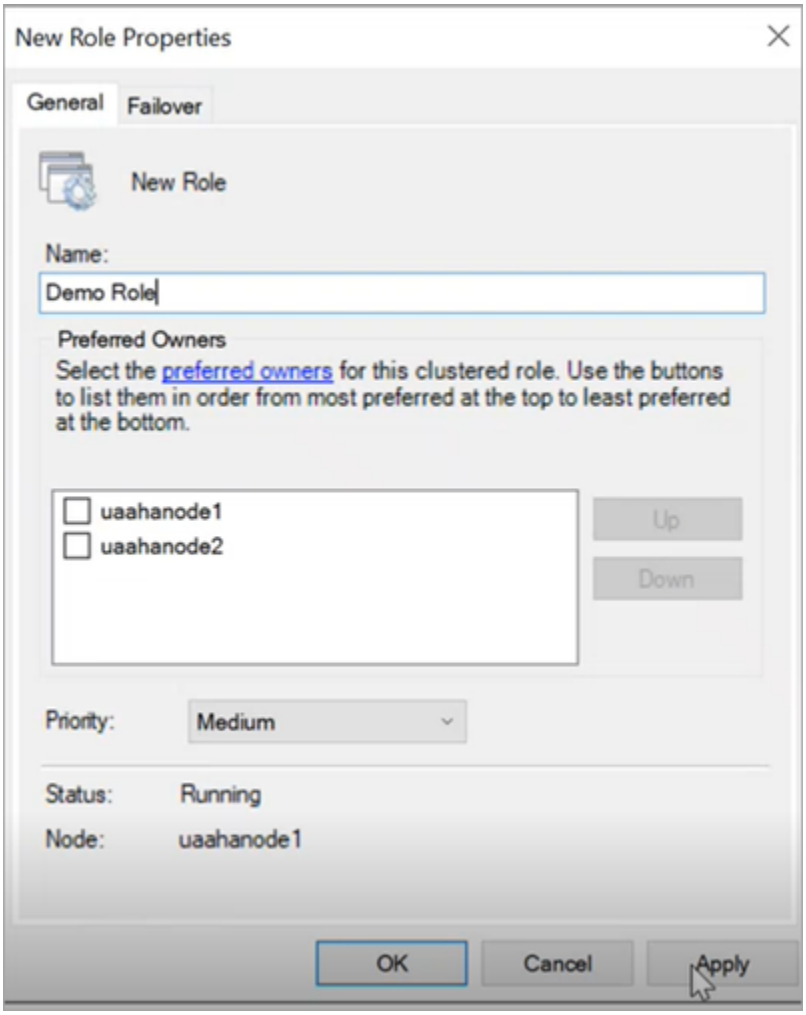
Configure Role

This topic describes how to configure a highly available virtual machine.

In failover cluster technology, each highly available virtual machine is considered to be a role.

You can perform the following steps on either Node1 or Node2. Suppose you perform these steps on Node1, they are automatically applied to Node2.

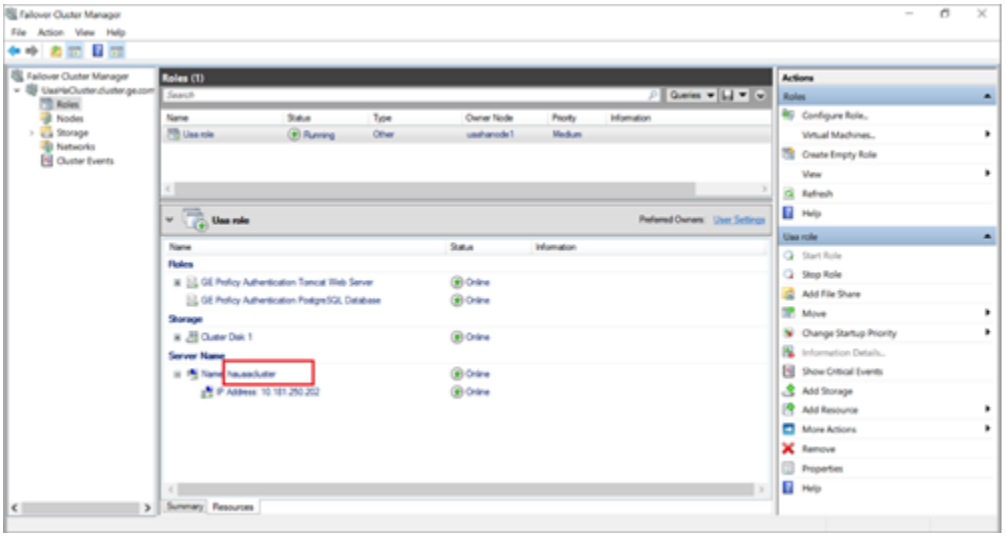
1. Log in to any of the iSCSI initiator nodes.
2. Go to **Start > Administrative Tools > Failover Cluster Manager**.
3. In Failover Cluster Manager, expand your cluster name and go to **Storage > Disks**.
   The cluster name is the unique name entered when creating your cluster. Refer to step 6 in Create a Cluster *(on page 228)*.
4. Right-click **Disks** and select **Add Disk**.
   The **Add Disks to a Cluster** screen appears.
5. Select the disk you want to add, and select **OK**.
6. In Failover Cluster Manager, expand your cluster name and select **Roles**.
7. Right-click **Roles** and select **Create Empty Role**.
   The newly created role appears in the Roles pane with the name `New Role`.
8. Right-click `New Role` and select **Properties**.
   The **New Role Properties** screen appears.
9. Enter a name for the new role, and select **Apply**.
   You can assign the role to multiple node servers and set an order of preference.
   For example, the new name is `Demo Role`.



10. Right-click `Demo Role` and select **Add Storage**.
    The **Add Storage** screen appears.
11. Select the storage that is already associated to the cluster, and select **OK**.
12. Right-click `Demo Role` and select **Add Resource > Client Access Point**.
13. Complete **New Resource Wizard** with the following options.

Section	What To Do
Client Access Point	Enter a name. For example, `hauaacluster` Make a note of this name. You need to provide the fully qualified domain name while installing Proficy Authentication. See step 3a in Configure Proficy Authentication Installation *(on page 238)*. For example, `hauaacluster.cluster.ge.com` wherein `cluster.ge.com` is the

Section	What To Do
	domain where cluster is installed. Make sure all the initiator nodes are in the same domain name.
Confirmation	The network name and IP address are displayed for confirmation. **Note:** After creating this resource, the IP address and the name should be added to the `hosts` file on the node servers configured for high availability.
Configure Client Access Point	Verifies the validity of the client access point settings and creates a new resource.
Summary	Select **Finish**.



On the node servers configured for high availability, go to `..\Windows\System32\Drivers\etc\hosts` and open the file in a text editor to add the network IP address and name as follows.

```
<ipaddress>   hauaacluster.cluster.ge.com

        <ipaddress>   hauaacluster
```

In the above example, `<ipaddress>` should be replaced with the actual ip address of your machine.

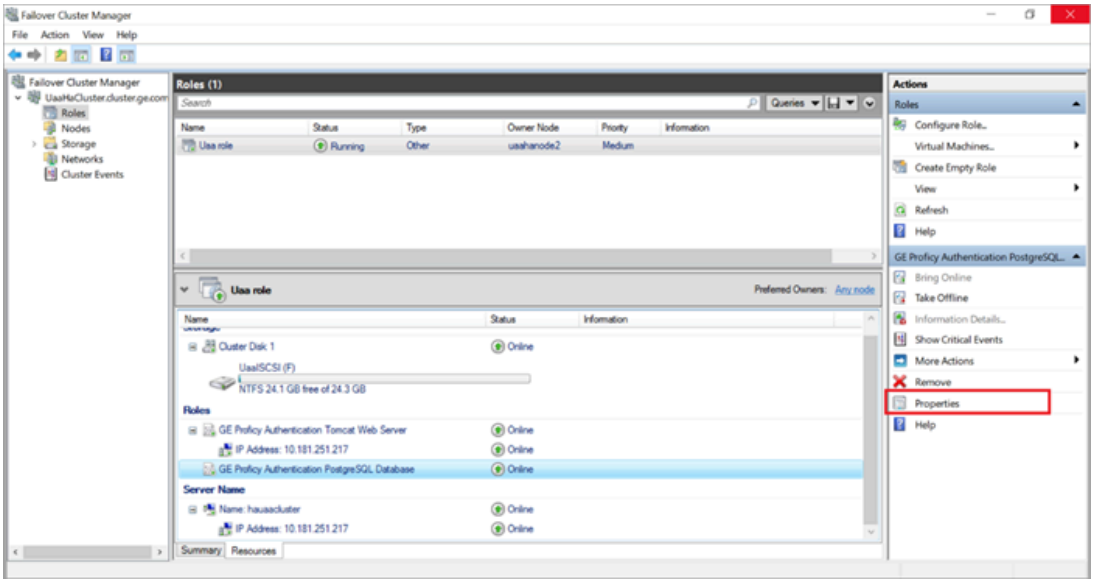
14. Right-click `Demo Role` and select **Add Resource > Generic Service**.
15. Complete **New Resource Wizard** with the following options:

Section	What To Do
Select Service	In the services list, select `GE Proficy Authentication Tomcat Web Service`.
Confirmation	Skip to the next section.
Configure Generic Service	Skip to the next section.
Summary	Select **Finish**.

16. Add the dependency service to role using properties of the added service, so that services restart when switching the node (failover condition).

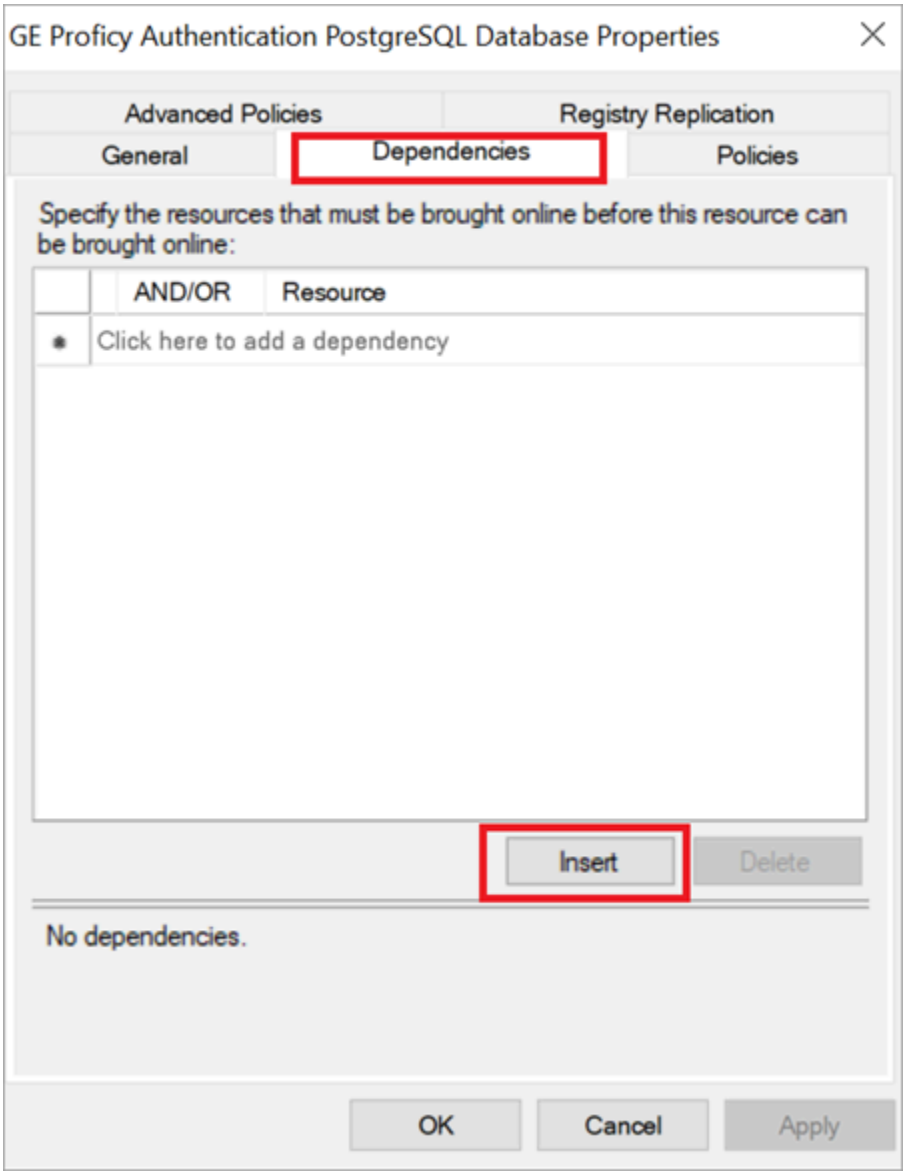
    a. In Failover Cluster Manager, select the added service.

    b. Select **Properties**.



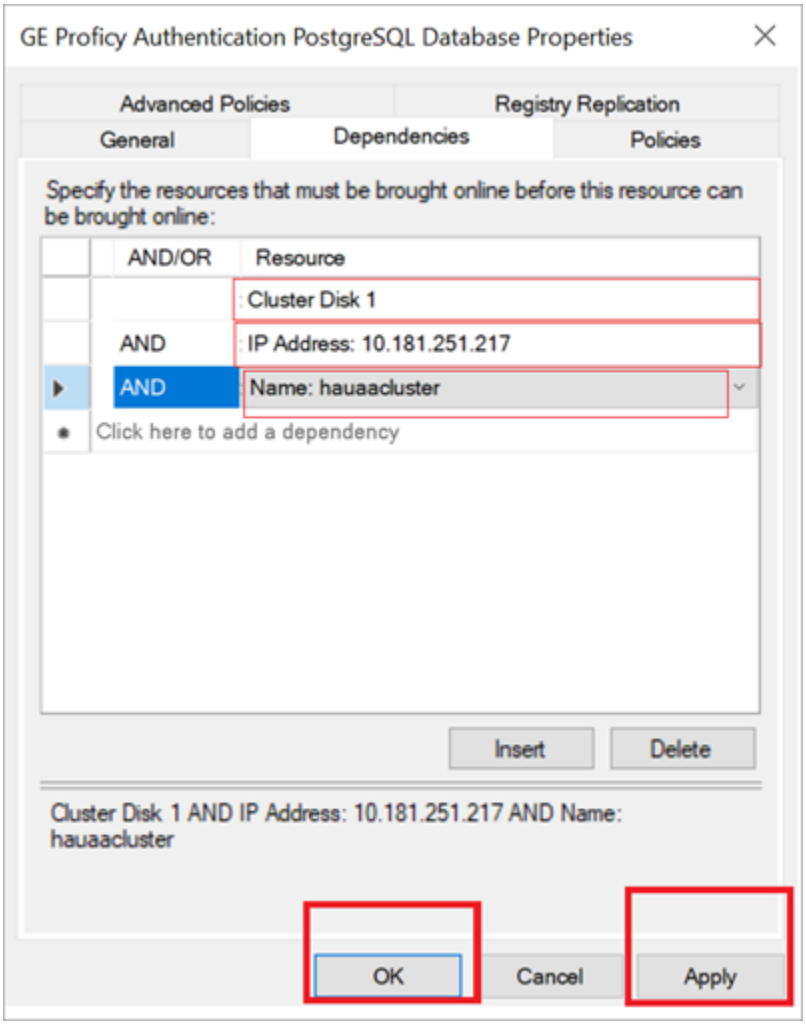
    The properties screen for that service appears.

    c. Select the **Dependencies** tab, and select **Insert**.



A row is added to specify our required dependencies.

d. From the drop-down, select the required resource one by one to be added as part of dependencies.



e. After inserting the resource, select **Apply** and then **OK**.

Configure Proficy Authentication Installation

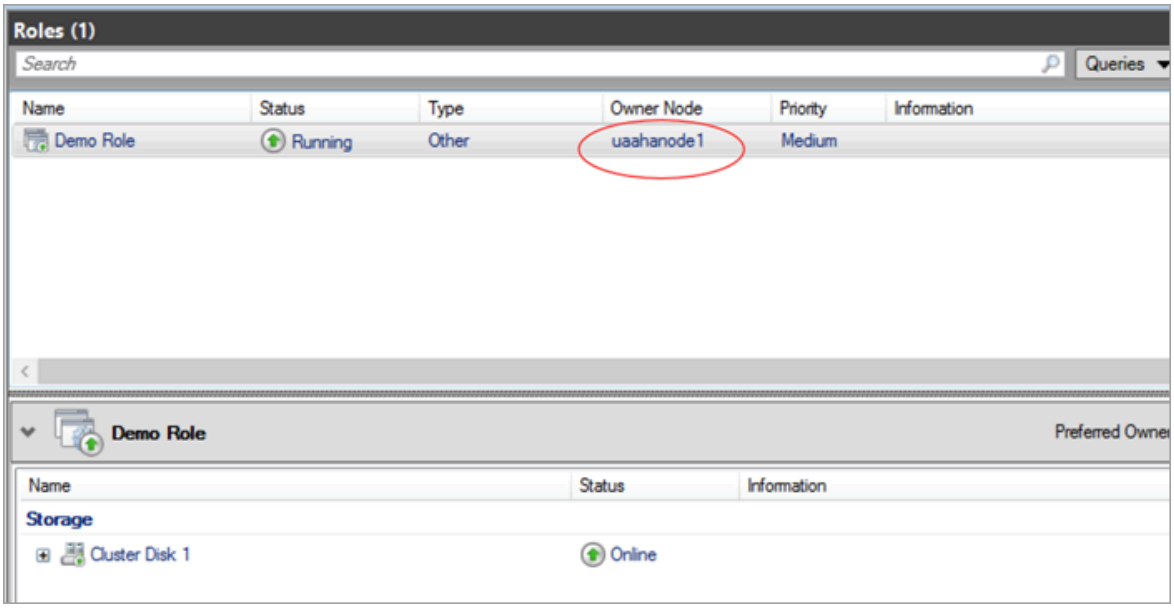
This topic describes Proficy Authentication installation setup in a high available environment.

For fresh installation, you can straightaway proceed with the procedural steps in this topic. But, if you want to use an existing database, do the following before you start with the procedural steps:

1. Copy your Proficy Authentication existing database (found in the Postgress database location) from wherever installed to the shared drive created using the iSCSI server. When you copy, make sure the cluster is pointing to the drive before copying the database. For example, if the cluster is pointing to Node1, then copy the database to Node1.
2. Make a note of the location path where you copied the database in the iSCSI server. For example, `F:\UaaConf`. You need to provide this path for installing Proficy Authentication on Node1 and Node2 machines.

To install Proficy Authentication on the iSCSI initiators (Node1 and Node2), make sure the shared drive in available on the node where you want to run the installation.

1. Log in to the iSCSI initiator Node1 server.
2. Open Failover Cluster Manager and verify that the cluster role is associated to the node where you want to install Proficy Authentication.



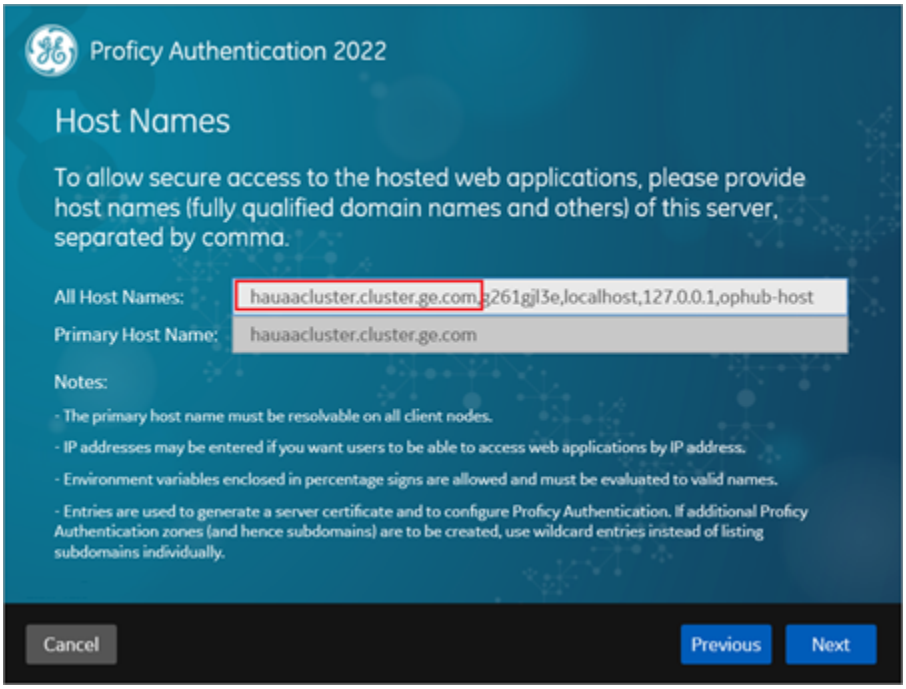
If not, then follow these steps to associate the node server:

a. Right-click your cluster role and select **Select Node**.
The **Move Clustered Role** screen appears.

b. Select the Node1 server, and select **OK**.
Once the cluster is mapped to Node1, the shared drive is available on Node1.

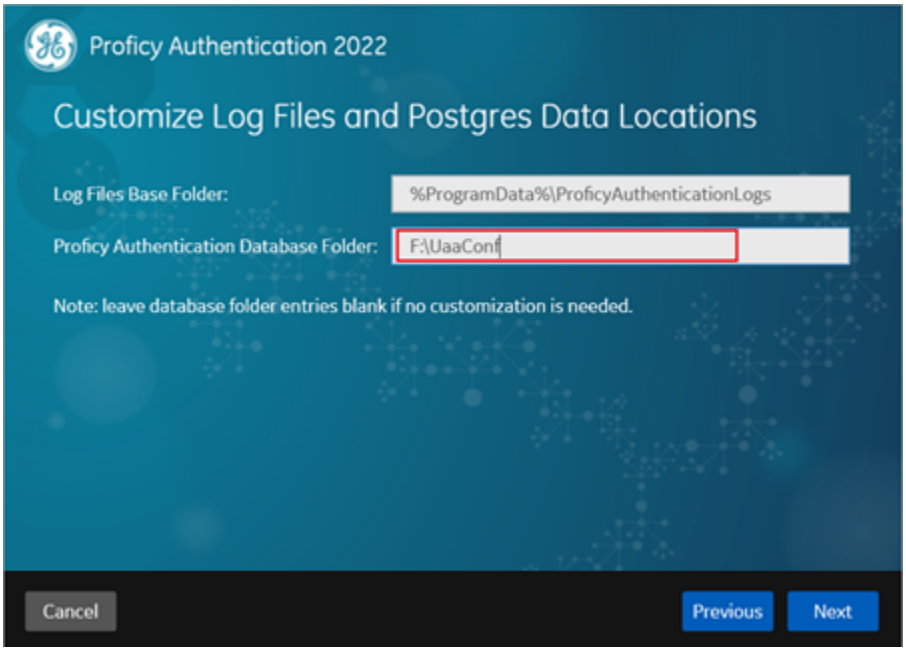
3. Run Proficy Authentication installation setup, and provide these details for the respective screens:

a. In **All Host Names** field, enter `hauaacluster.cluster.ge.com` as the leading hostname, followed by any other hostname/s.



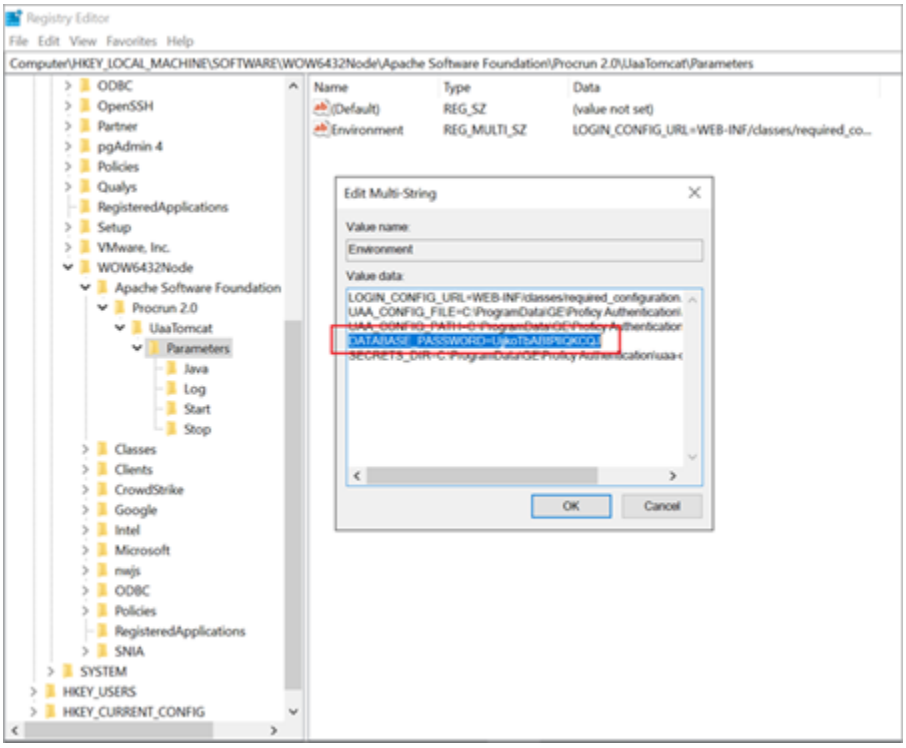
b. This step applies for associating existing database. Enter the iSCSI server shared drive location path where you copied the Proficy Authentication database. Refer to the steps at the beginning of this topic *(on page 238)*.

For example, `F:\UaaConf`

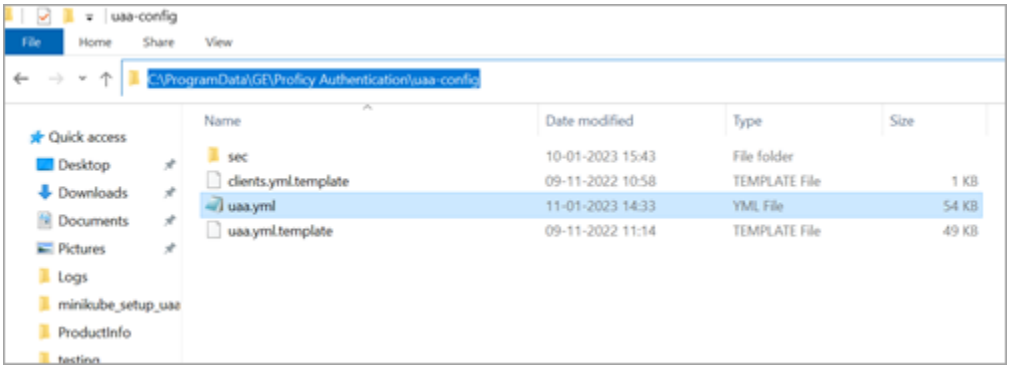


4. Log in to the iSCSI initiator Node2 server, and repeat the above steps to install Proficy Authentication on Node2.
5. After installing Proficy Authentication on both the nodes, copy the `DATABASE_PASSWORD` registry key from the last installed node to overwrite the registry key in the first installed node.
   For example, in the following scenario:
   a. First Proficy Authentication is installed successfully on the Node1 machine.
   b. Next Proficy Authentication is installed successfully on the Node2 machine.

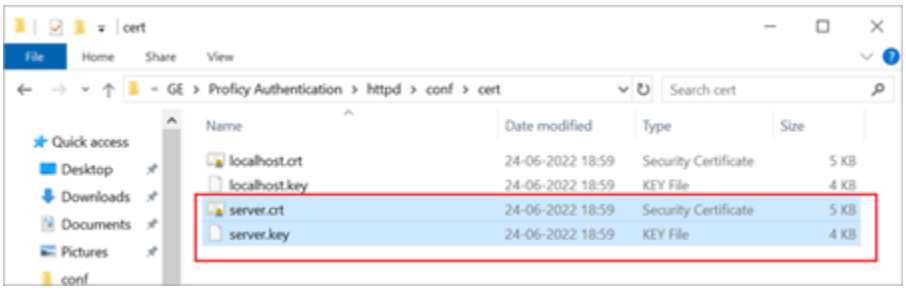
   Node2 is considered as the latest installation. Node1 is considered as the first installation. So, copy the Node2 registry key and overwrite the Node1 registry key.



6. Copy and replace the `UAA.yaml` file from Node 2 (latest installation) to Node 1 (first installation).
   The file is located here `C:\ProgramData\Proficy\Proficy Authentication\uaa-config`



7. Copy `server.crt` and `server.key` from Node 2 (latest installation) to Node 1 (first installation). The certificates are located here: `C:\Program Files\Proficy\Proficy Authentication\httpd\conf\cert`



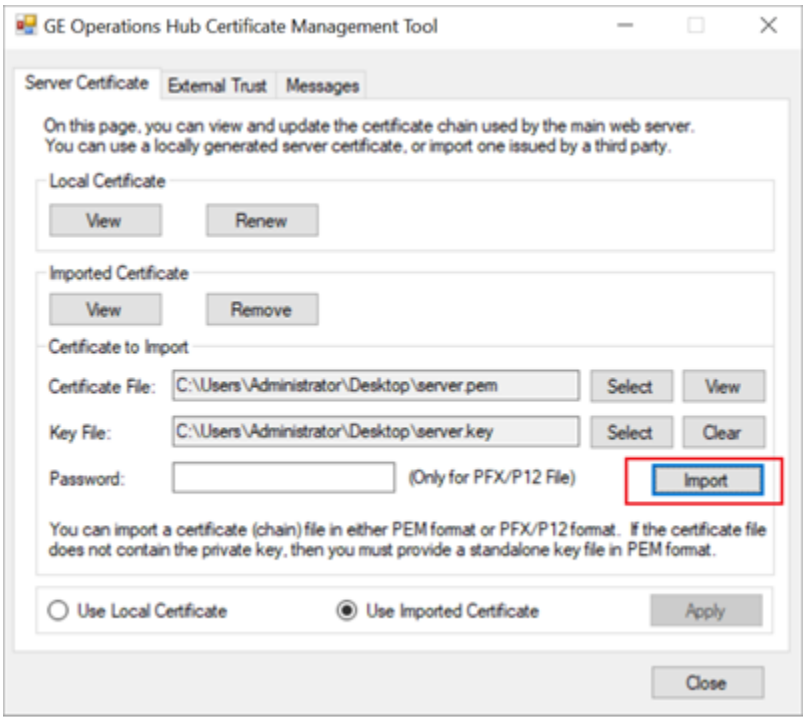
8. After copying the certificates (to Node1), rename `server.crt` to `server.pem`.

9. Open  **Certificate Management Tool** on Node1 from the desktop shortcut, and import the certificates as follows:

    a. For **Certificate File**, select the `server.pem` file created in the earlier step.

    b. For **Key File**, select the `server.key` file.

    c. Select **Import**.



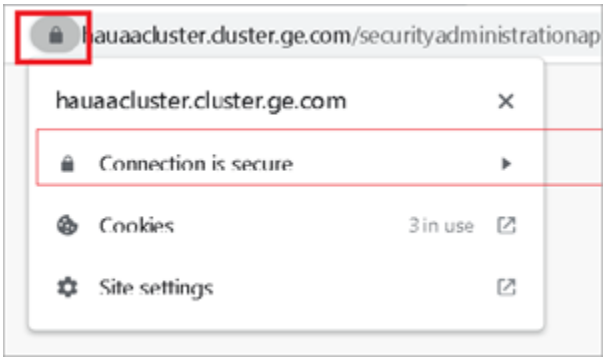
Prerequisites for Installing Operations Hub with External Proficy Authentication

This topic describes how to install Operations Hub with external Proficy Authentication in a high available environment.

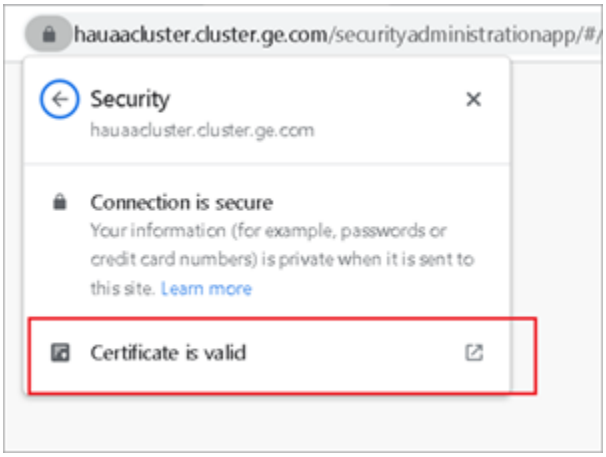
Set up a high available environment. See Configure High Availability for Proficy Authentication *(on page 220)*.

These steps apply for installing Operations Hub with external Proficy Authentication. The steps include mandatory changes prior to installing Operations Hub on any highly available server.

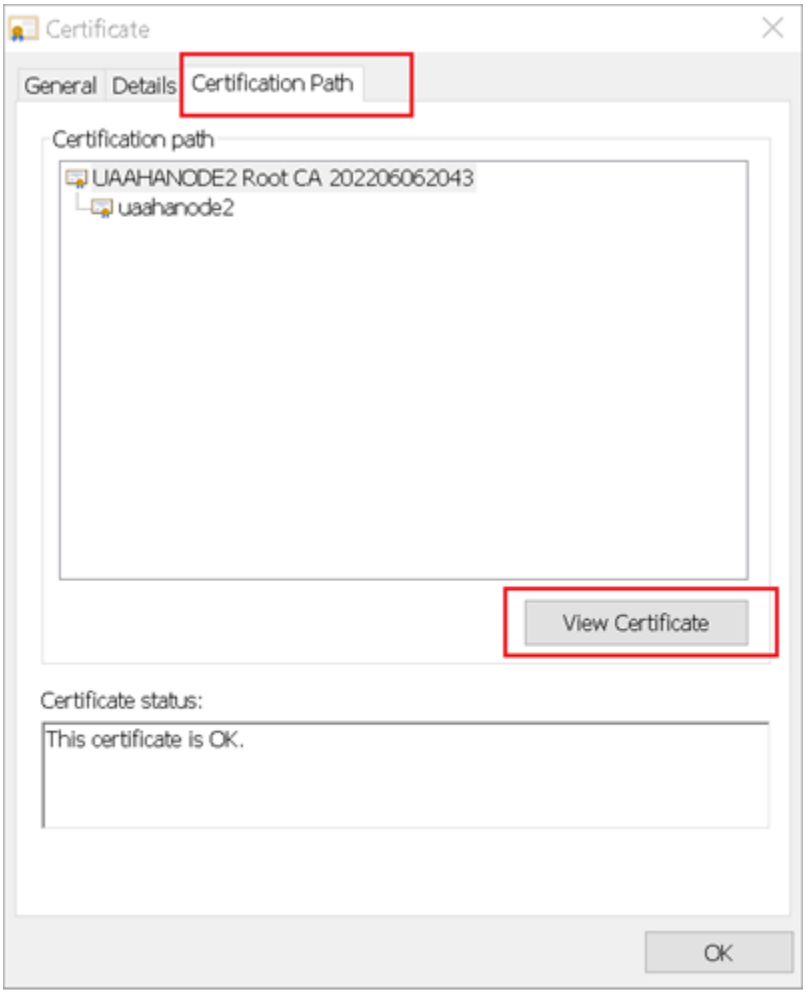
1. Log in to the node server where you want to install Operations Hub.
2. Open a browser and enter `https://hauaacluster.cluster.ge.com /securityadministrationapp/`
3. Select the lock icon next to the web address, and then select **Connection is secure**.



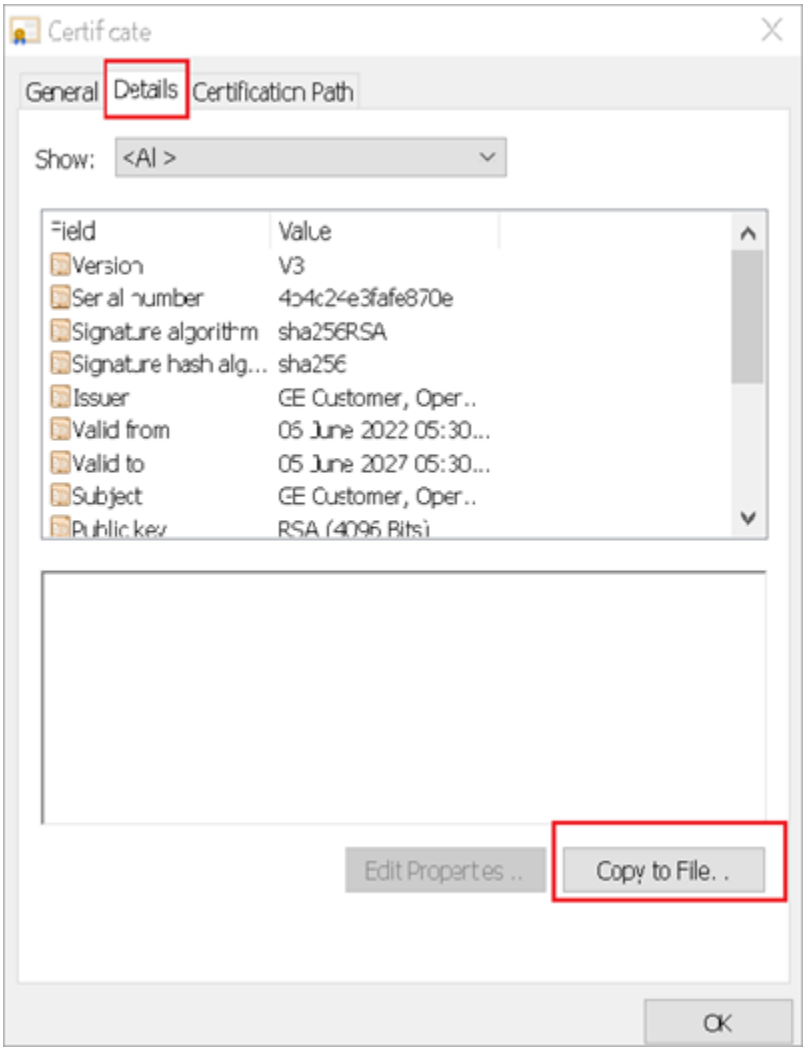
4. Select **Certificate is valid**.



   The issued certificate appears.
5. Select **Certificate Path > View Certificate**.

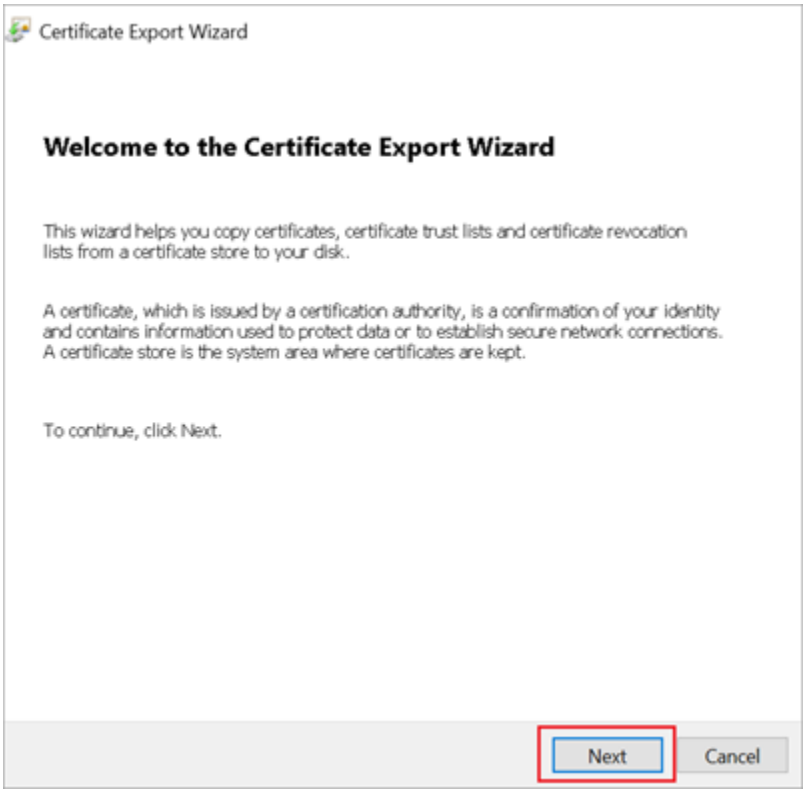


6. Select **Details > Copy to File**.

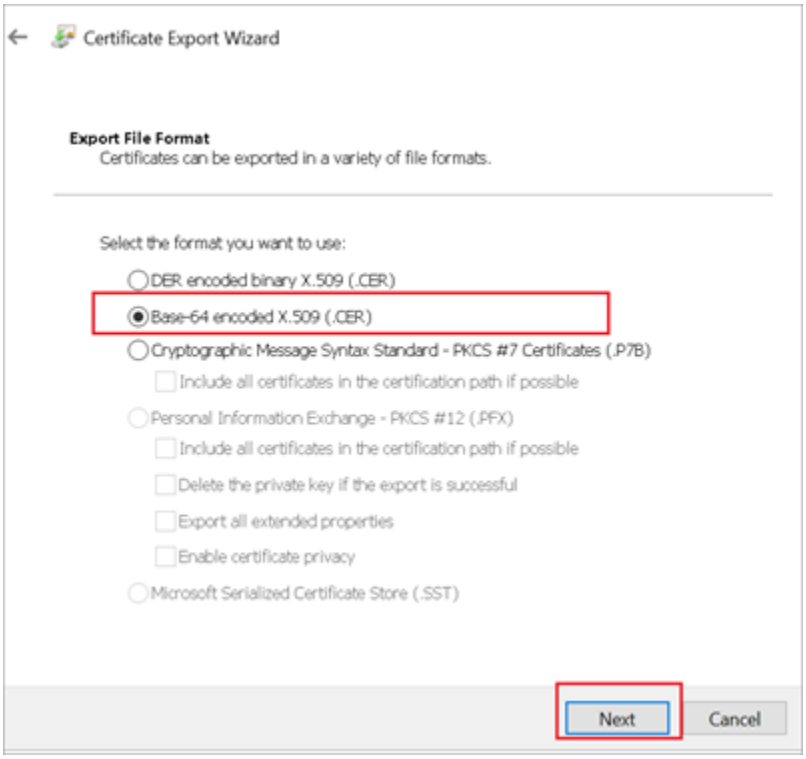


The **Certificate Export Wizard** appears.

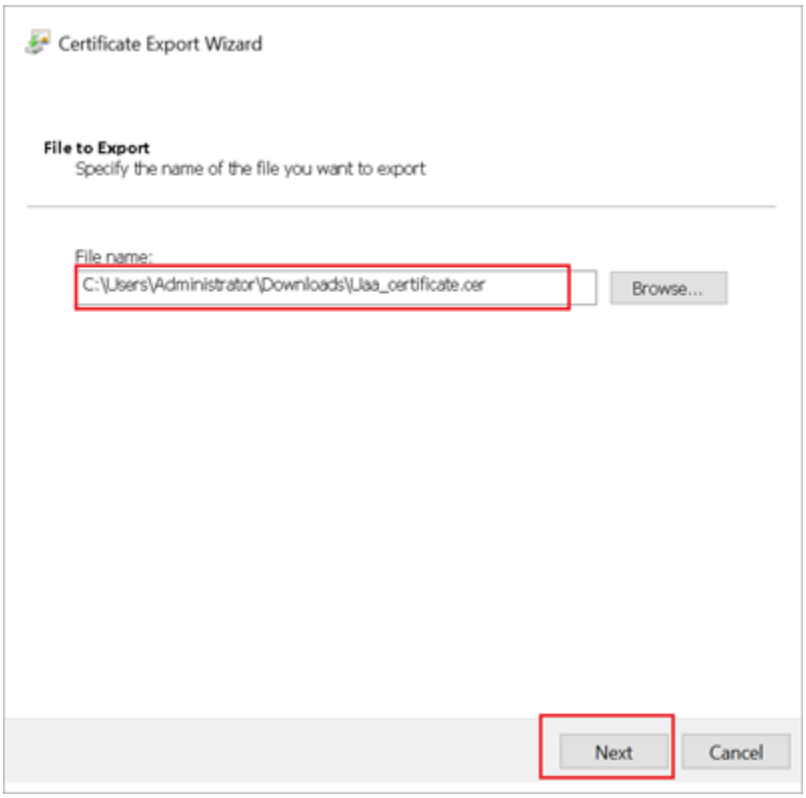
7. Select **Next**.



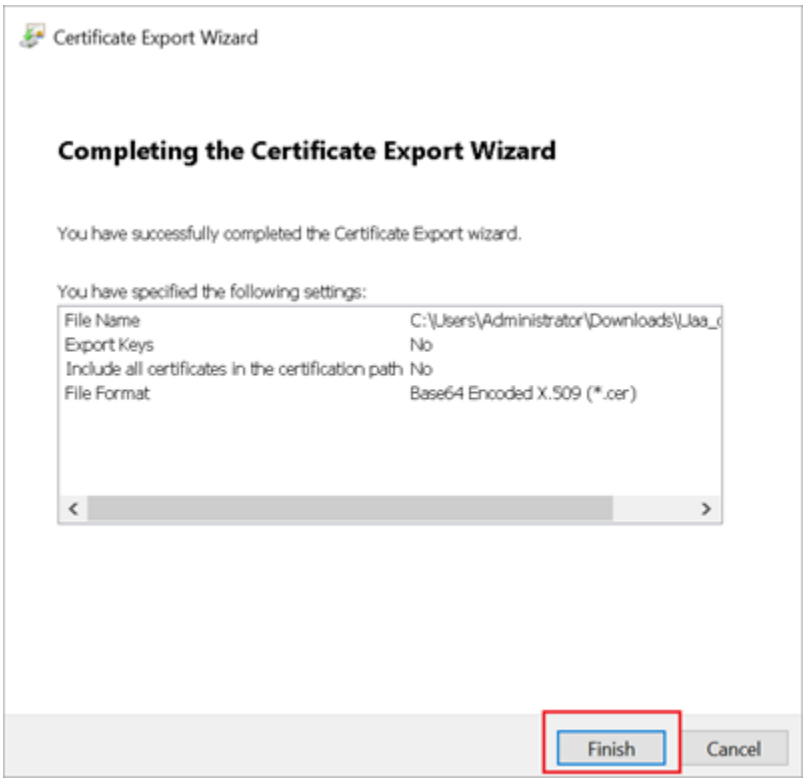
8. Select **Base-64 encoded X.509 (.CER)**, and select **Next**.



9. Browse and specify the file location, and select **Next**.

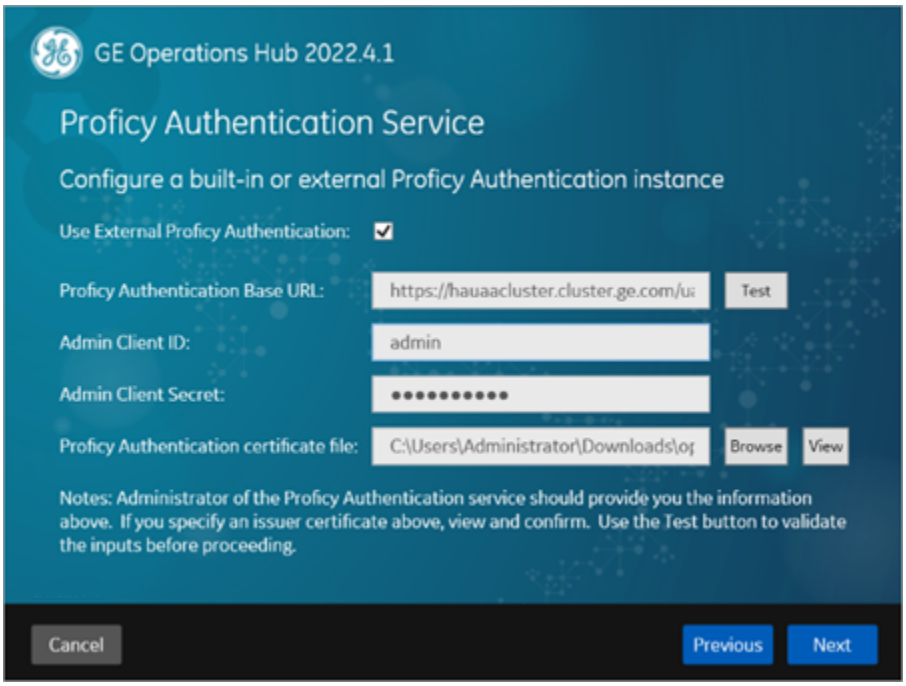


10. Select **Finish**.



11. Rename `Uaa_certificate.crt` to `Uaa_certificate.pem`.
12. Run Operations Hub installation setup, and provide these details for external Proficy Authentication fields:

Proficy Authentication Base URL	`https://hauaacluster.cluster.ge.com/uaa`
Admin Client ID	`admin`
Admin Client Secret	`Gei@321itc`



Operations Hub is installed successfully.

Customize Login Screen

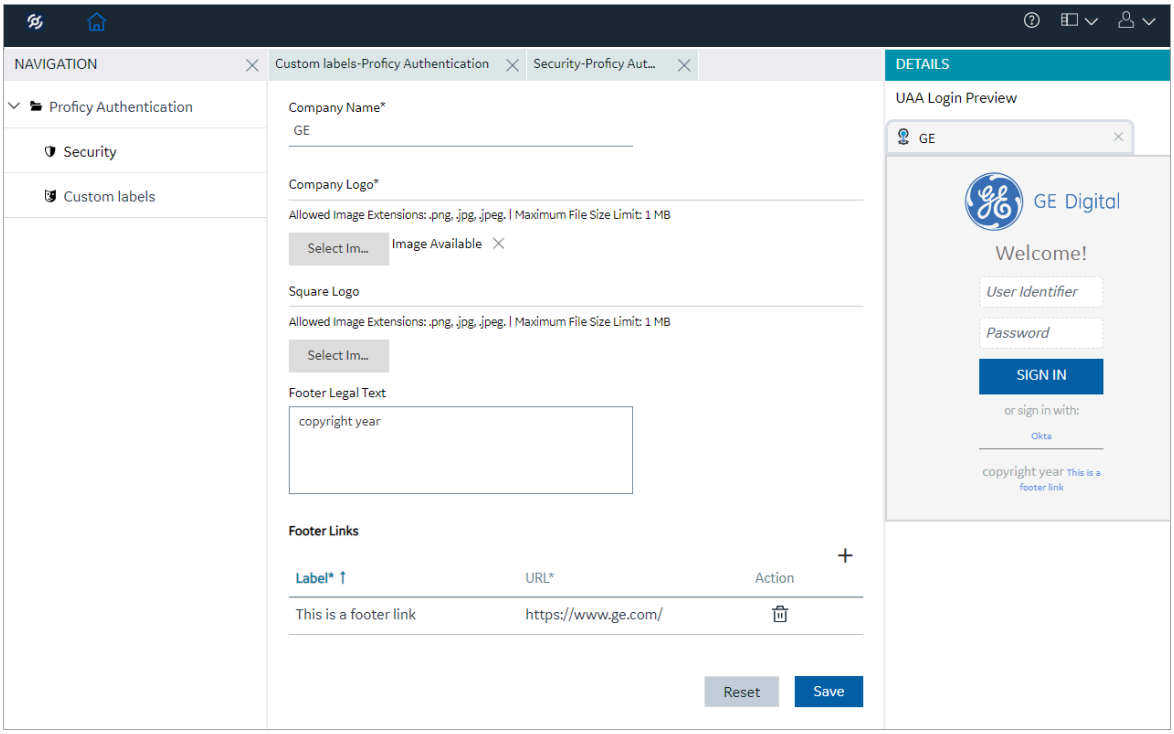
This topic describes how to customize the Proficy Authentication login screen.

You can customize the company name, logo, favicon, and include additional text/links to appear on the login screen.

1. Log in to Configuration Hub.
2. Go to **Proficy Authentication > Custom labels**.
   The default login screen details appear.
3. Use the following fields to customize your login screen.
   A quick preview appears on the **DETAILS** tab.

Field	Description
Company Name	Name of the company that appears on the login homepage.
Company Logo	Select an image from your local system to upload as the company logo. Accepted file formats are PNG and JPG/JPEG. The file you're trying to upload cannot be larger than 1MB. **Note:** If you've uploaded a company logo up to 2MB in size in the 2023 version, upgrading to the 2024 version will not cause any issues. Select ✕ to remove an existing image.
Square Logo	Select an image from your local system to upload as a favicon, which appears on the browser tab. Accepted file formats are PNG and JPG/JPEG. The file you're trying to upload cannot be larger than 1MB. **Note:** If you've uploaded a square logo up to 2MB in size in the 2023 version, upgrading to the 2024 version will not cause any issues. Select ✕ to remove an existing image.
Footer Legal Text	Use this space to enter any legal information.
Footer Links	To add hyperlinks, create a label and provide a URL to connect. a. Select + to add a row. b. Enter a label name. c. Enter a URL for the label name. Select 🗑 to delete existing labels.

4. Select **Save** to save the updates you made to the login screen appearance.
   To undo the saved changes, select **Reset**. The login screen is reset to the previously saved appearance.



5. Restart `GE Proficy Authentication Tomcat Web Server` to apply the changes.

Backup and Restore

This topic describes how to perform backups and restore the Proficy Authentication database.

Note:

Consider these restrictions while performing backup and restore:

- You can only restore data to the same host (or to a host with the same hostname).
- You should restore data to the same version of Proficy Authentication.

For steps to create a backup, refer to Back Up the Proficy Authentication Database *(on page 250)*.

For steps to restore a backup, refer to Restore the Proficy Authentication Database *(on page 252)*.

Back Up the Proficy Authentication Database

This topic provides steps to create a backup of the Proficy Authentication database.

You must have administrative access to perform the steps.

1. Log in to the machine where Proficy Authentication is installed.
2. Download the PowerShell scripts and unzip the file.
3. Open Windows 'Services Management Console' and stop the `Proficy Authentication Tomcat Web Server` service.
4. Launch Windows PowerShell as an administrator.
5. Use the command line to navigate to the location where the backup script file was downloaded.
6. Execute the following command to create a backup: `.\Backup_ProficyAuthentication.ps1`
   For example,

   ```
   C:\Users\Administrator\Desktop> .\Backup_ProficyAuthentication.ps1
   ```

   The `PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS.zip` file is created and saved to `C:\ProgramData` location.

   The `YYYYMMDD-HHMMSS` in the filename includes the respective backup's datetime value.

   The following table details the files and folders selected by the PowerShell script and included in the backup zip file. It provides information on each item, its default location on the system, and the corresponding target location within the zip file.

File/Folder Name	Default Location	Target Folder
`data-v13`	`C:\ProgramData\GE\Proficy Authentication\uaa-postgres`	`PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS\uaa-postgres`
`uaa.yml`	`C:\ProgramData\GE\Proficy Authentication\uaa-config`	`PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS\uaa-config`
`uaa-httpd.conf`	`C:\Program Files\GE\Proficy Authentication\httpd\conf\app-specific.d`	`PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS\uaa-config`
`server.xml`	`C:\Program Files\GE\Proficy Authentication\uaa-tomcat\conf`	`PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS\uaa-config`
`Certificate(if exist)`	`C:\ProgramData\GE\Proficy Authentication\cert-manager\extraca\ldap_-SecAdminSrv`	`PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS\uaa-config`
`keytab file(if exist)`	`C:\ProgramData\GE\Proficy Authentication\uaa-config`	`PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS\uaa-config`

Restore the Proficy Authentication Database

This topic provides steps to restore a backup on your system.

You must have administrative access to perform the steps.

The restore operation deletes everything from the current system database. Therefore, it is recommended to take a backup of your current database before proceeding with the restore operation. This backup will allow you to recover your current data in case you decide to cancel the restore operation. See Back Up the Proficy Authentication Database *(on page 250)*.

1. Log in to the machine where Proficy Authentication is installed.
2. Download the PowerShell scripts and unzip the file.
3. Open Windows 'Services Management Console' and stop the `Proficy Authentication Tomcat Web Server` service.
4. Launch Windows PowerShell as an administrator.
5. Use the command line to navigate to the location of the backup file you want to restore.
6. Execute the following command to restore the backup: `.\Restore_ProficyAuthentication.ps1 C:\ProgramData\PROFICY_AUTHENTICATION_BKP_YYYYMMDD-HHMMSS.zip`

   For example,

   ```
   C:\Users\Administrator\Desktop> .\Restore_ProficyAuthentication.ps1
   C:\ProgramData\PROFICY_AUTHENTICATION_BKP_20240228-143602.zip
   ```

   The database is restored.
7. Perform Set up Proficy Authentication *(on page 135)* to start using the restored database.

Troubleshooting: Restoring Active Directory User Login

If Active Directory user login fails after a restore, then check if any LDAP connection is configured in the identity provider of the security plug-in. Do the following:

1. Navigate to the Security plug-in in Configuration Hub.
2. Open each LDAP connection, trust and save it again.

Troubleshooting Proficy Authentication

Error 431: Request Header Fields Too Large

The error indicates that the size of the HTTP request header exceeds the limit set by the server.

The 431 error can be a symptom of poor scopes administration. Ensure that you are following the principle of least privilege when assigning scopes to users. By limiting the number of scopes assigned to each user to only what is necessary, you can reduce the size of the request header. However, if you still receive the error in spite of optimizing the user scopes, you can adjust the HTTP request header size in the Tomcat server configuration. To do so, follow these steps:

1. Access the Operations Hub installation folder on your machine.
2. Navigate to `iqp-tomcat/conf/server.xml`.
3. In the `server.xml` file, look for Catalina service Connector section and locate the field `maxHttpHeaderSize` to modify its value.

   The default value is `8192`. Increase the size to a higher value, such as `16384` or `24576`.
4. Save the changes to the file and close it.
5. Restart the `GE Operations Hub IQP Tomcat Web Server` service from the Management Console.

Windows Auto-login Error Logs

This topic describes Windows Auto-login success/failure scenarios.

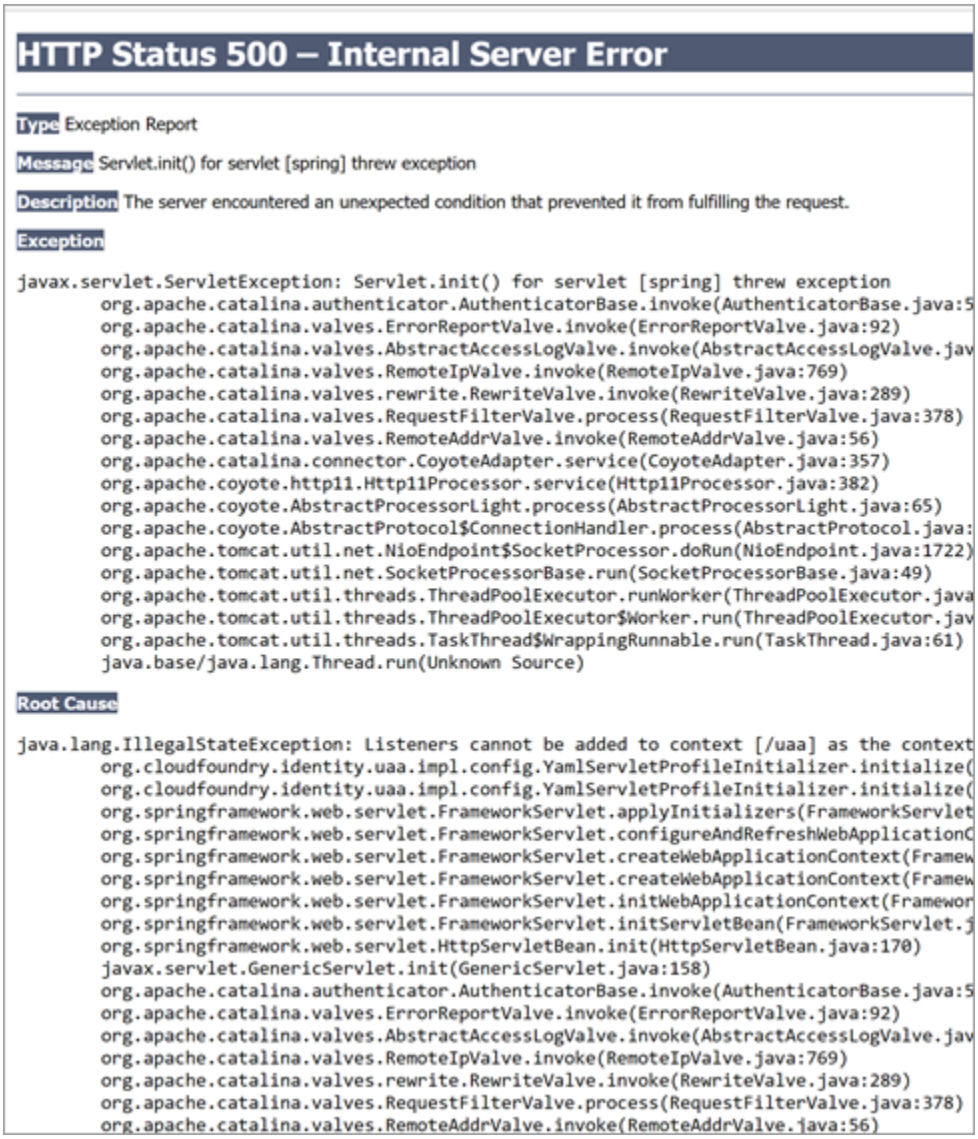
User logs in successfully

Verify the `uaa.log` if the TGT/Kerberos token is generated properly. It should start with **YII**. You can ignore the lengthy token value in the log entries.

```
[2022-02-22 19:29:41.949] cloudfoundry-identity-server - 14188 [http-nio-9480-exec-8] ....
 DEBUG --- SpnegoAuthenticationProcessingFilter: Received Negotiate Header for request
 https://win16-sachin.uaatestad.ge.com/uaa/: Negotiate YIIHVQYGKwY********
```

A local Windows (non-domain) user attempts Windows Auto-login (using query parameter in the URL) from a domain member machine

Browser displays an error. The error message also appears in `uaa.log`. The following error appears when attempting to login with domain name in the URL.



HTTP Status 500 – Internal Server Error

Type Exception Report

Message Servlet.init() for servlet [spring] threw exception

Description The server encountered an unexpected condition that prevented it from fulfilling the request.

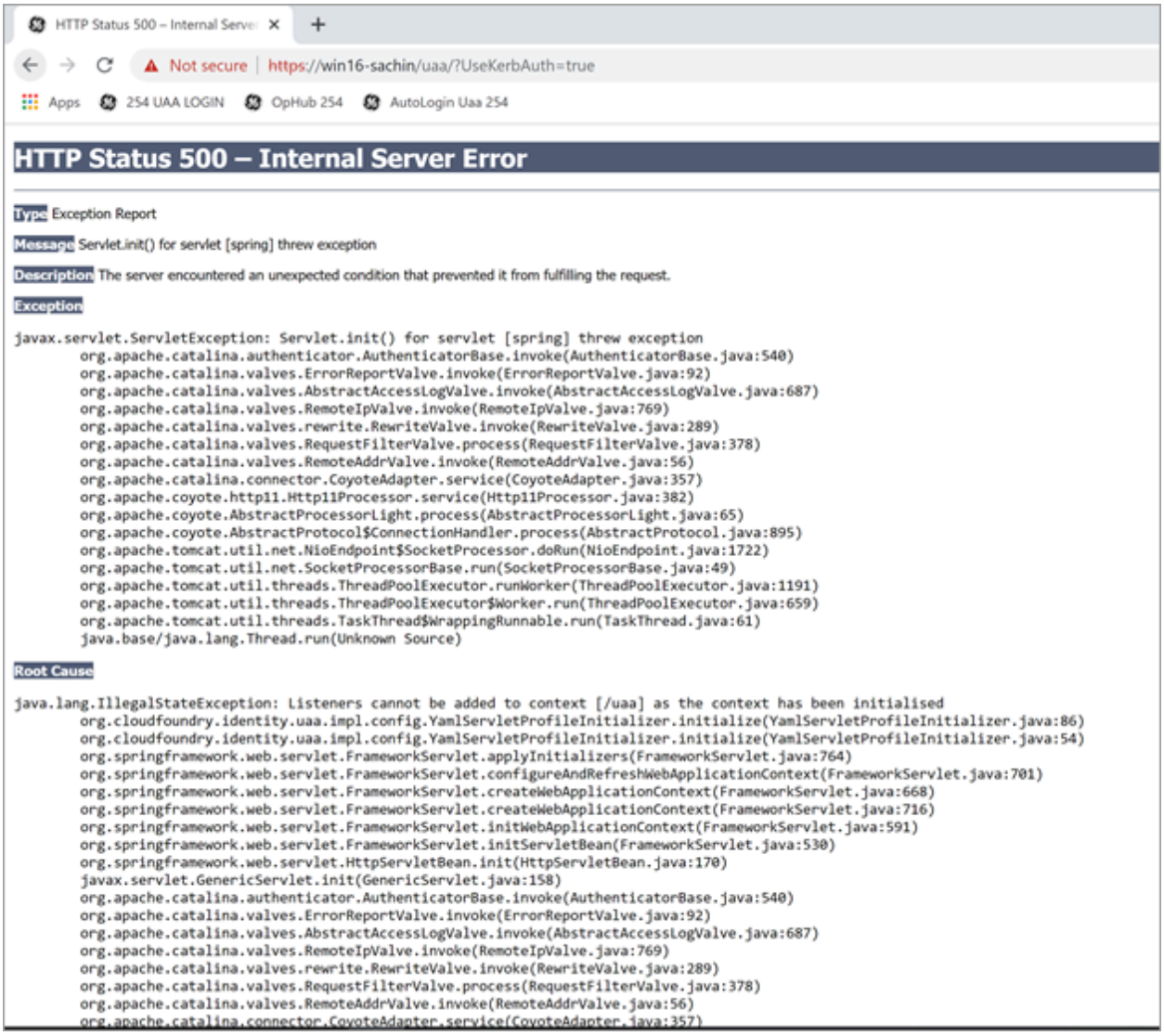
Exception

```
javax.servlet.ServletException: Servlet.init() for servlet [spring] threw exception
        org.apache.catalina.authenticator.AuthenticatorBase.invoke(AuthenticatorBase.java:5
        org.apache.catalina.valves.ErrorReportValve.invoke(ErrorReportValve.java:92)
        org.apache.catalina.valves.AbstractAccessLogValve.invoke(AbstractAccessLogValve.jav
        org.apache.catalina.valves.RemoteIpValve.invoke(RemoteIpValve.java:769)
        org.apache.catalina.valves.rewrite.RewriteValve.invoke(RewriteValve.java:289)
        org.apache.catalina.valves.RequestFilterValve.process(RequestFilterValve.java:378)
        org.apache.catalina.valves.RemoteAddrValve.invoke(RemoteAddrValve.java:56)
        org.apache.catalina.connector.CoyoteAdapter.service(CoyoteAdapter.java:357)
        org.apache.coyote.http11.Http11Processor.service(Http11Processor.java:382)
        org.apache.coyote.AbstractProcessorLight.process(AbstractProcessorLight.java:65)
        org.apache.coyote.AbstractProtocol$ConnectionHandler.process(AbstractProtocol.java:
        org.apache.tomcat.util.net.NioEndpoint$SocketProcessor.doRun(NioEndpoint.java:1722)
        org.apache.tomcat.util.net.SocketProcessorBase.run(SocketProcessorBase.java:49)
        org.apache.tomcat.util.threads.ThreadPoolExecutor.runWorker(ThreadPoolExecutor.java
        org.apache.tomcat.util.threads.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.jav
        org.apache.tomcat.util.threads.TaskThread$WrappingRunnable.run(TaskThread.java:61)
        java.base/java.lang.Thread.run(Unknown Source)
```

Root Cause

```
java.lang.IllegalStateException: Listeners cannot be added to context [/uaa] as the context
        org.cloudfoundry.identity.uaa.impl.config.YamlServletProfileInitializer.initialize(
        org.cloudfoundry.identity.uaa.impl.config.YamlServletProfileInitializer.initialize(
        org.springframework.web.servlet.FrameworkServlet.applyInitializers(FrameworkServlet
        org.springframework.web.servlet.FrameworkServlet.configureAndRefreshWebApplicationC
        org.springframework.web.servlet.FrameworkServlet.createWebApplicationContext(Framew
        org.springframework.web.servlet.FrameworkServlet.createWebApplicationContext(Framew
        org.springframework.web.servlet.FrameworkServlet.initWebApplicationContext(Framewor
        org.springframework.web.servlet.FrameworkServlet.initServletBean(FrameworkServlet.j
        org.springframework.web.servlet.HttpServletBean.init(HttpServletBean.java:170)
        javax.servlet.GenericServlet.init(GenericServlet.java:158)
        org.apache.catalina.authenticator.AuthenticatorBase.invoke(AuthenticatorBase.java:5
        org.apache.catalina.valves.ErrorReportValve.invoke(ErrorReportValve.java:92)
        org.apache.catalina.valves.AbstractAccessLogValve.invoke(AbstractAccessLogValve.jav
        org.apache.catalina.valves.RemoteIpValve.invoke(RemoteIpValve.java:769)
        org.apache.catalina.valves.rewrite.RewriteValve.invoke(RewriteValve.java:289)
        org.apache.catalina.valves.RequestFilterValve.process(RequestFilterValve.java:378)
        org.apache.catalina.valves.RemoteAddrValve.invoke(RemoteAddrValve.java:56)
```

The following error appears when attempting to login with non-domain name in the URL.



Bad or missing keytab file (or) Bad SPN in `uaa.yml` file

The following errors appear in `uaa.log`.

```
[2022-02-21 19:09:21.839] cloudfoundry-identity-server - 13956 [http-nio-9480-exec-8] .... ERROR ---

 DynamicKerberosAuthenticationManager: Kerberos validation not successful. Encountered Bad Credentials Exception :

 Kerberos validation not successful

[2022-02-21 19:09:21.839] cloudfoundry-identity-server - 13956 [http-nio-9480-exec-8] .... ERROR ---

 DynamicKerberosAuthenticationManager: Kerberos validation not successful. Encountered Bad Credentials Exception :

 Kerberos validation not successful

[2022-02-21 19:09:21.839] cloudfoundry-identity-server - 13956 [http-nio-9480-exec-8] .... ERROR ---

 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : null
```

```
[2022-02-21 19:09:21.839] cloudfoundry-identity-server - 13956 [http-nio-9480-exec-8] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : null
[2022-02-21 19:09:21.839] cloudfoundry-identity-server - 13956 [http-nio-9480-exec-8] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Defective token detected (Mechanism
 level: GSSHeader did not find the right tag)
[2022-02-21 19:09:21.839] cloudfoundry-identity-server - 13956 [http-nio-9480-exec-8] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Defective token detected (Mechanism
 level: GSSHeader did not find the right tag)
[2022-02-21 19:09:21.839] cloudfoundry-identity-server - 13956 [http-nio-9480-exec-8] ....
  WARN --- SpnegoAuthenticationProcessingFilter: Negotiate Header was invalid: Negotiate
 TlRMTVNTUAABAAAAl4II4gAAAAAAAAAAAAAAAAAAAAAKADk4AAAADw==
org.springframework.security.authentication.BadCredentialsException: Bad Credentials excpetion. It could be due to
 keytab file and the SPN configuration.
```

Crypto Mismatch

A crypto mismatch occurs if the encryption algorithm specified while using `ktpass.exe` to generate keytab does not match what is supported by the service account.

```
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Kerberos validation not successful. Encountered Bad Credentials Exception :
 Kerberos validation not successful
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Kerberos validation not successful. Encountered Bad Credentials Exception :
 Kerberos validation not successful
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : null
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : null
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Failure unspecified at GSS-API
 level (Mechanism level: Invalid argument (400) - Cannot find key of appropriate type to decrypt AP-REQ - RC4 with
 HMAC)
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Failure unspecified at GSS-API
 level (Mechanism level: Invalid argument (400) - Cannot find key of appropriate type to decrypt AP-REQ - RC4 with
 HMAC)
```

```
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Invalid argument (400) - Cannot
 find key of appropriate type to decrypt AP-REQ - RC4 with HMAC
[2022-02-22 11:39:18.326] cloudfoundry-identity-server - 6084 [http-nio-9480-exec-3] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Invalid argument (400) - Cannot
 find key of appropriate type to decrypt AP-REQ - RC4 with HMAC
```

Clock skew between client and server

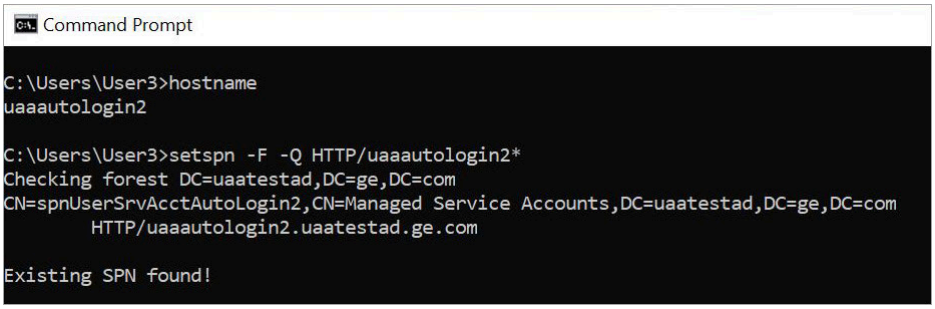
The following errors appear in `uaa.log`.

```
[2022-02-19 13:14:55.556] cloudfoundry-identity-server - 14532 [http-nio-9480-exec-9] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : null
[2022-02-19 13:14:55.556] cloudfoundry-identity-server - 14532 [http-nio-9480-exec-9] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : null
[2022-02-19 13:14:55.556] cloudfoundry-identity-server - 14532 [http-nio-9480-exec-9] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Failure unspecified at GSS-API
 level (Mechanism level: Clock skew too great (37))
[2022-02-19 13:14:55.556] cloudfoundry-identity-server - 14532 [http-nio-9480-exec-9] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Failure unspecified at GSS-API
 level (Mechanism level: Clock skew too great (37))
[2022-02-19 13:14:55.556] cloudfoundry-identity-server - 14532 [http-nio-9480-exec-9] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Clock skew too great (37)
[2022-02-19 13:14:55.556] cloudfoundry-identity-server - 14532 [http-nio-9480-exec-9] .... ERROR ---
 DynamicKerberosAuthenticationManager: Root cause for Kerberos validation failure : Clock skew too great (37)
```

Note:
Make sure the clocks on all the three systems are synchronized.

Useful SPN commands

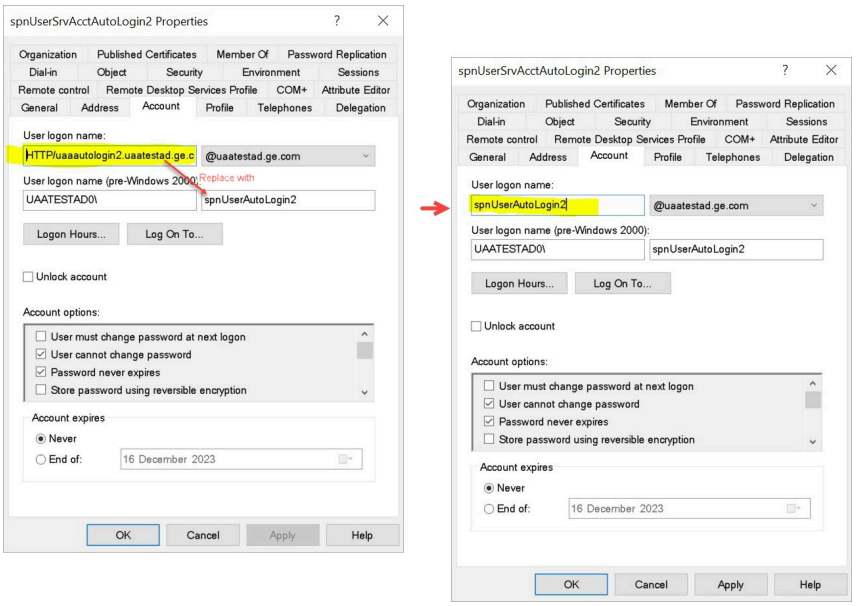
To view existing SPNs	`setspn -F -Q HTTP/<FQDN>` Example: `setspn -F -Q HTTP/phantomhost.uaatestad.ge.com@UAATESTAD.GE.COM`

	
To delete SPN	`setspn -D HTTP/<FQDN> <user account>` Example: `setspn -D HTTP/phantomhost.uaatestad.ge.com@UAATESTAD.GE.COM ghost1`

How to Un-Register an Existing Service Principal Name (SPN)

The following steps ensure the un-registration of the existing SPN and the necessary updates in Active Directory.

Step 1: **Delete Any Other SPN (if exists)**	Run the command `setspn -D HTTP/thenameyougavetothespn spnUserName` Replace: • `thenameyougavetothespn` with the SPN you want to unregister • `spnUserName` with the user who created the SPN being un-registered. 
Optional step: **Verify Un-Registration**	Run the command `setspn -F -Q HTTP/thenameyougavetothespn*`
Step 2: **Update Logon Name in Active Directory**	1. Go to Active Directory. 2. Open the properties of the existing `spnUserName`.

	3. Change the logon name from `HTTP/uaaautologin2.uaatestad.ge.com` to `SAMAccountName` or User logon name (pre-Windows 2000). 

Resolving JWT Token Size and Autologin Challenges

When a user is assigned to many groups, there are issues with JWT token size, leading to rejection of requests by Tomcat due to the exceeded header size limit. Additionally, there are problems configuring autologin and logging into Operations Hub with the autologin feature, resulting in a "Bad Request" error.

This issue arises when a user is a member of many Active Directory user groups. The size of the HTTP request header, which contains the Kerberos token in the WWW-Authenticate header, increases with the number of user groups. If the header size exceeds the server-configured limits, the server rejects the request.

To resolve the issue, do the following:

Update HTTPD Configuration File	1. Visit the location `C:\Program Files\GE\Proficy Authentication\httpd\conf\app-specific.d\uaa-httpd.conf` and open `uaa-httpd.conf` in a text editor.
	2. Add the following code:
	`#SPNEGO authentication HTTP request header size`
	`LimitRequestFieldSize 16384`
	3. Save and close the httpd configuration file.

Update Tomcat Configuration File	1. Visit the location `C:\Program Files\GE\Proficy Authentication\uaa-tomcat\conf\server.xml` and open `server.xml` in a text editor. 2. Locate the Connector element and change the `maxHttpHeaderSize` attribute. Change `maxHttpHeaderSize`="8192" to `maxHttpHeaderSize`="16384". `<Connector connectionTimeout="20000" redirectPort="8443" port="9480" maxPostSize="2097152" maxHttpHeaderSize="16384" protocol="HTTP/1.1"></Connector>` 3. Save and close the tomcat configuration file. **Note:** • The default value for the header size is `LimitRequestFieldSize` 8192 bytes (8k). • The default value for `maxHttpHeaderSize` is 8192.

Issue: Duplicate LDAP User Creation in Proficy Authentication Database

This topic describes potential LDAP IDP configuration choices that may lead to the issue and offers guidance on how to avoid it.

The issue can occur when using multiple LDAP IDP configurations, especially in scenarios involving 'multi-domain support' introduced in version 2023.

Leveraging Multi-Domain Support

The introduction of 'multi-domain support' aimed to allow the configuration of multiple LDAP IDPs, primarily to support user authentication and authorization across *different domains* (multiple LDAP servers) through a single instance of the Proficy Authentication service.

Secondary Usecase: The 'multi-domain support' feature can also be utilized to configure multiple LDAP IDPs for a *single domain* (single LDAP server). This is often done when dealing with large domains with users spread across the directory structure.

Problem Scenario: A potential challenge arises when selecting a single User or Group Search Base in the IDP configuration. This choice may lead to a generic scope, resulting in timeout errors during user

authentication. The issue stems from the extensive search scope for both User and Group searches. To avoid these timeout errors, it is crucial to carefully consider and configure the User and Group Search Base values to align with the specific structure and distribution of users within the targeted domain.

Solution: When setting up multiple LDAP IDPs targeting a single domain or LDAP server, ensure that the 'User Search Base' values across the IDP configurations are distinct. In other words, a user from the configured domain should not be found in more than one LDAP IDP.

Neglecting this precaution can result in a user being authenticated from multiple LDAP IDPs, leading to the creation of multiple user records with different 'origin' names in the UAA Database. This situation can further cause authorization issues in applications like Operations Hub (or any other client application) if authorization selections are made at the individual user level rather than for user groups.

Chapter 4. iFIX

Overview

iFIX Overview

iFIX is a Windows-based HMI/SCADA component designed to allow easy integration and interoperability between the plant floor and business systems. It includes functional and architectural features that reduce the design time for automation projects, allow simple system upgrades and maintenance, provide seamless integration with third-party applications, and increase productivity.

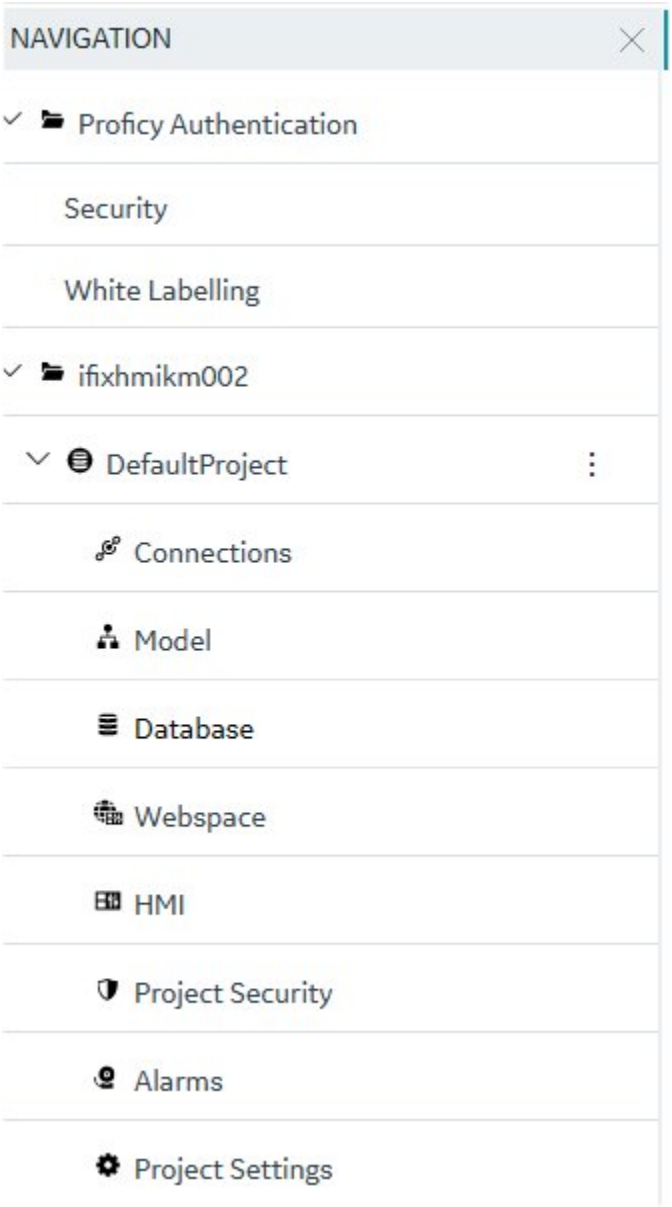
- The SCADA portion of iFIX provides monitoring, supervisory control, alarming, and control functions. It guarantees the absolute integrity of data and provides complete distributed networking capabilities.
- The HMI portion of iFIX is the window into your process. It provides all the tools you need to develop pictures that operators can use to monitor your process.

Overview of iFIX in Configuration Hub

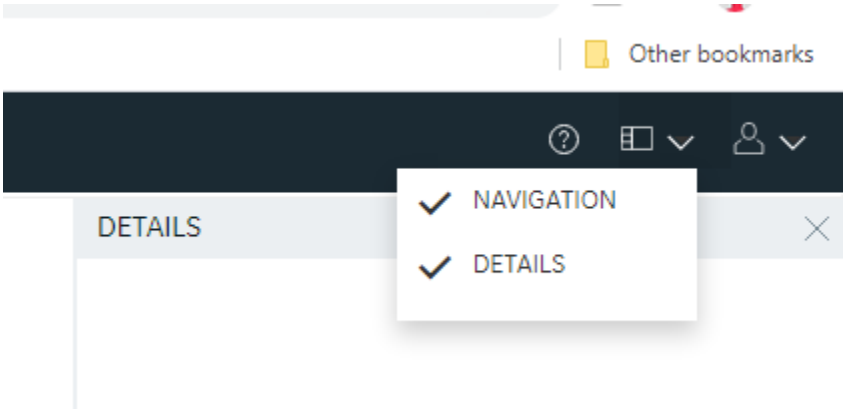
For iFIX, you can launch Configuration Hub from the Applications ribbon bar in the iFIX WorkSpace.

You can also launch Configuration Hub from the icon on your desktop, but be aware that you will get an error message unless you have a running iFIX project.

Use the Navigation panel to open any of the configuration panels.



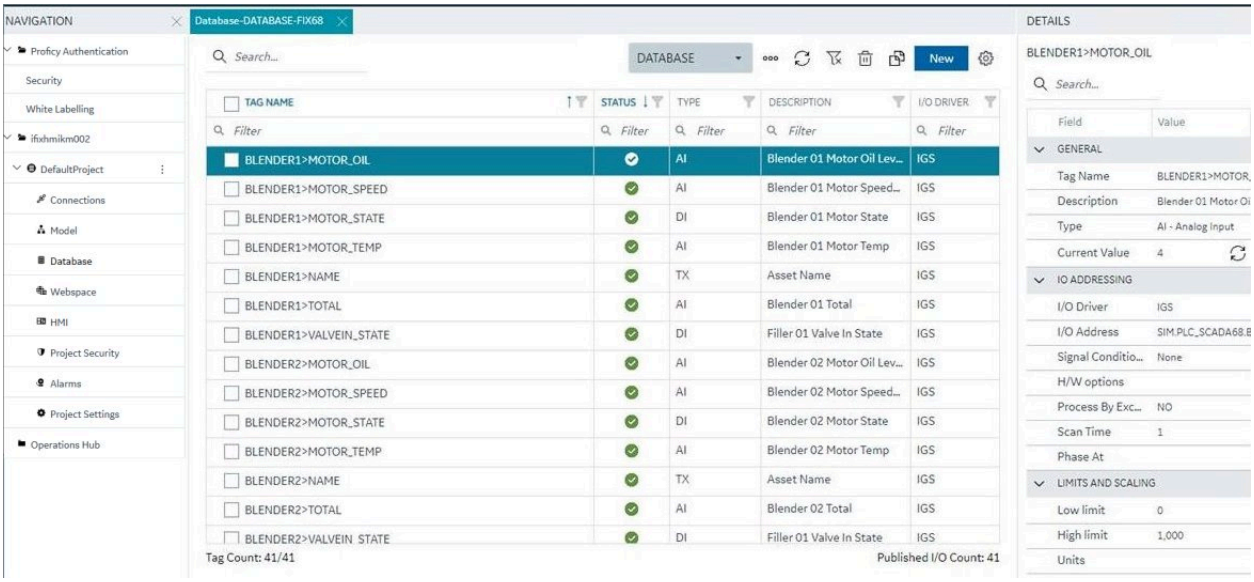
The Navigation panel can be closed to give you more real estate in your IDE and can be re-opened again from the common toolbar on the top right.



Integrated Development Environment

Integrated Development Environments or "IDE's" are configuration tools that provide flexibility in how you layout a number of panels and tools that work together in building a system. Popular development tools that are IDEs include Microsoft Visual Studio and Jupyter Notebook.

Configuration Hub leverages web technologies to create a panel-based experience for configuring Proficy products that allows you to move, open, close and resize panels in such a way as to reflect the most convenient and efficient way for you to work on your configuration.



Prerequisites to Use Configuration Hub with iFIX

The following prerequisites are required in order to use iFIX with Configuration Hub:

1. You must enable security before you can log in to Configuration Hub through the browser.
2. You must use a Proficy Authentication user to login to Configuration Hub. The default user is ch_admin, and the default password is your client secret entered at install.
3. The ch_admin user should have access to all of the iFIX application features. In Proficy Authentication, include these groups include: `scada.fix_shared_IFIX_PROFICY_AUTH_ADMIN` and `scada.proficy.admin`.
4. You can use either a user's login name or the Full Name to login to Configuration Hub.
5. Configuration Hub can only be run with iFIX SCADA or Historian Server nodes.
6. An iFIX node configured to use Configuration Hub should be registered using the Registration tool (available from Applications menu in Workspace) if Configuration Hub is not installed along with iFIX. See the iFIX Plugin Registration *(on page 268)* topic for more details.
7. Multiple users can log into the same server and make changes, from different browser sessions.
8. If using Enhanced Failover with iFIX, you must be in Maintenance Mode before you log in to Configuration Hub. (When you enter Maintenance Mode, SCADA synchronization temporarily stops; synchronization between the SCADA pair is suspended.) After Maintenance Mode is enabled, you can make changes to the database on the primary node.
9. The time on Configuration Hub server and the iFIX SCADA node should be synchronized.
10. Use any of the following browsers tested for use with Configuration Hub: Google® Chrome, Microsoft® Edge based on Chromium, Mozilla® Firefox, or Apple® Safari (MAC OS only).

> **Note:**
> Sometimes the MAC OS cannot resolve the system name. In this case, update the hosts file. Also, on the MAC OS, you will be required to manually install the Configuration Hub root certificate.

Configuration Information

Local and Remote Installations

Configuration Hub supports product registrations local to the same machine as Configuration Hub and as remote plugins. For a remote plugin registration, you do NOT need to install Configuration Hub on the remote computer. Instead, simply use the registration tool on the Application tab in the iFIX WorkSpace. If on a domain, be sure to use the fully qualified domain name in the server name fields.

For example, say you choose to install Configuration Hub on the same machine as iFIX and Historian. Subsequent iFIX and Historian installations on different servers in the same network can be registered with the originally installed Configuration Hub instead of installing Configuration Hub again. This allows

you to open Configuration Hub centrally from a browser and be able to see and configure multiple product instances from that one installed instance of Configuration Hub.

iFIX – When you use the Proficy installer to install Configuration Hub, during installation you provide Client ID and Client Secret. You will need to take some additional steps after installation to complete the process, which includes registering the plug-in from the Applications tab on the iFIX WorkSpace ribbon bar. iFIX Security will also need to be enabled. Refer to the iFIX Plugin Registration *(on page 268)* for more details.

Historian – To register with an existing Configuration Hub during the Historian Web-based Clients install, when prompted, enter the client IDs & client secrets supplied during the original Configuration Hub install. Historian Web-based Clients can be installed on the iFIX node or separately.

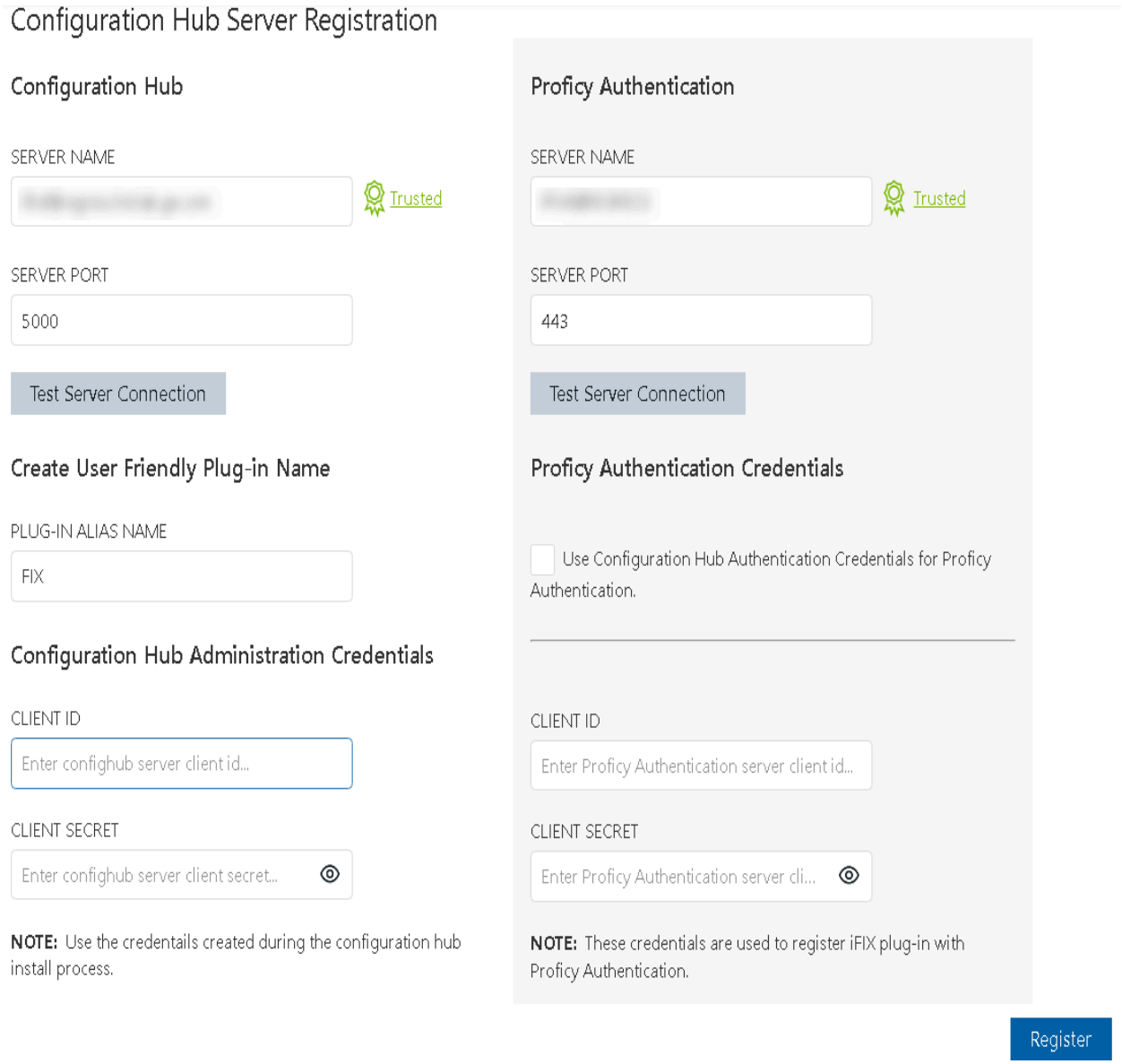
Installation Overview

Use the Common Components option on the Proficy installer to install Configuration Hub. Configuration Hub only needs to be installed only once. It does not need to be installed on remote nodes.

iFIX Registration Overview

After installing, you can register the iFIX SCADA with Configuration Hub using the Register option on the Applications toolbar in the iFIX WorkSpace.

Enter the Server name and port and click Test Server Connection to continue. Click the Trusted link to enable the trust between the computers. Enter the Client ID and Client Secret supplied during installation of Configuration Hub to complete the registration.



Remote Registration Overview

Before you register a remote Configuration Hub, be sure that the latest Microsoft Updates are installed. Remote registration uses the same iFIX Registration process. However, you will most likely need to enter the Server names for Configuration Hub and Proficy Authentication. Use the fully qualified domain name if on a domain.

iFIX Plugin Registration

The Node Manager Configuration Utility, which is installed during the iFIX install, allows you to register (in the case of an existing Configuration Hub), or re-register your iFIX product plugin with Configuration Hub when and if your setup changes. iFIX security must be enabled before you can register Configuration Hub.

The following sections describe how to use the Node Manager Configuration Utility.

Before you can Register Configuration Hub

- Make sure that users have been added in Windows, and that security is enabled on all of the iFIX SCADAs.
- Be aware that the Configuration Hub web server and the iFIX plugin ports must be allowed in the firewall exception rules during installation. If you do not do this during installation, you will need to add these applications manually to the firewall rules.
- If you are using Configuration Hub on a domain, you may need to update the HOSTS files on your network with the name of the Configuration Hub server, the iFIX SCADA Server, and Historian Server (if applicable).

Tip:

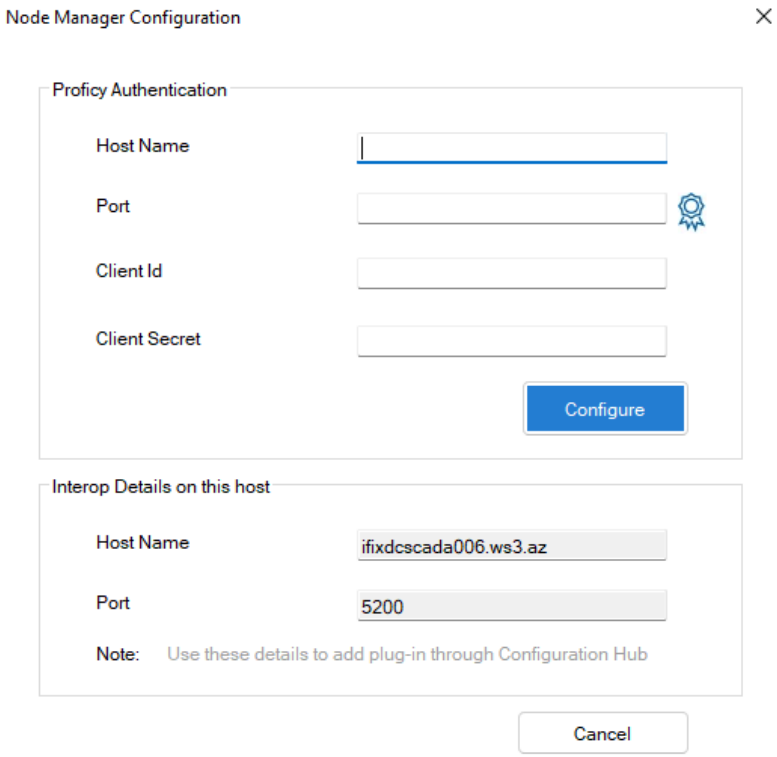
- You can find the HOSTS file in the C:\WINDOWS\system32\drivers\etc folder.
- Depending upon your permissions, you may need to copy this file to another folder, edit it, and then copy it back to the etc folder after your edits are complete.
- Use a text editor such as Notepad to edit the HOSTS file. To prevent Notepad from automatically adding a .TXT file extension when you save the file, in the Save as Type field, select “All Files.”
- An example entry in the HOSTS file is as follows: 198.212.170.4 SCADA01. If SCADA1 was the iFIX SCADA Server node name, but the computer name where the iFIX SCADA Server was installed was AREA1, you would need to add a second line to the HOSTS file for AREA1: 198.212.170.4 AREA1.
- If you do not know the TCP/IP address of a computer, run the IPCONFIG command on the SCADA Server to obtain it.
- The contents of the HOSTS file should be identical on each node in your network.
- If your iFIX SCADA Server node name is different from the computer name where iFIX is installed, you also need to add this name to each HOSTS file.
- For Historian, you may need to use the fully qualified domain name (FQDN) in the hosts file of the Web client's machine so it can connect properly to the Configuration Hub machine.

Run the Node Manager Configuration Utility

1. Use the desktop icon to run the Node Manager Configuration Utility

   with Administrator privileges.



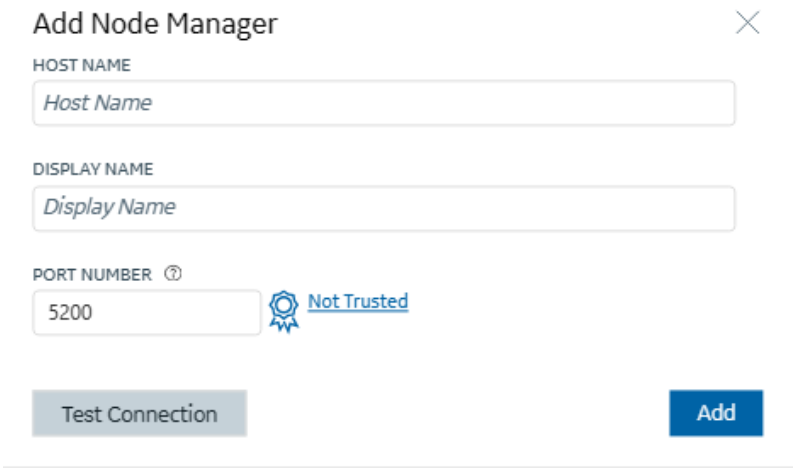
2. In the Proficy Authentication field, enter the Host Name of the Proficy Authentication server. Edit the value in the Port field if necessary. Enter the Client ID and Client Secret.
3. Click the certificate icon

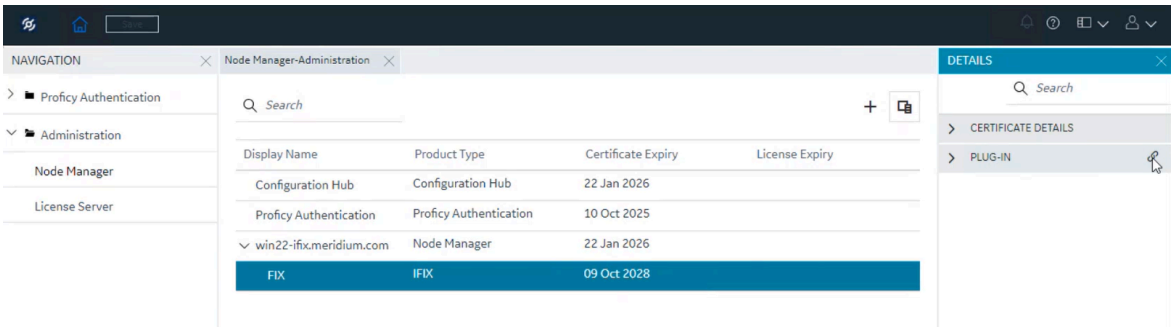
   to trust the certificate.
4. Click Configure.
5. Log into Configuration Hub to add the Node Manager.
6. Expand the Administration menu in the Navigation panel.
7. Click Node Manager. The Node Manager-Administration panel will open.
8. Click the Add Node Manager button

in the Node Manager-Administration pane. The Add Node Manager dialog box will appear.



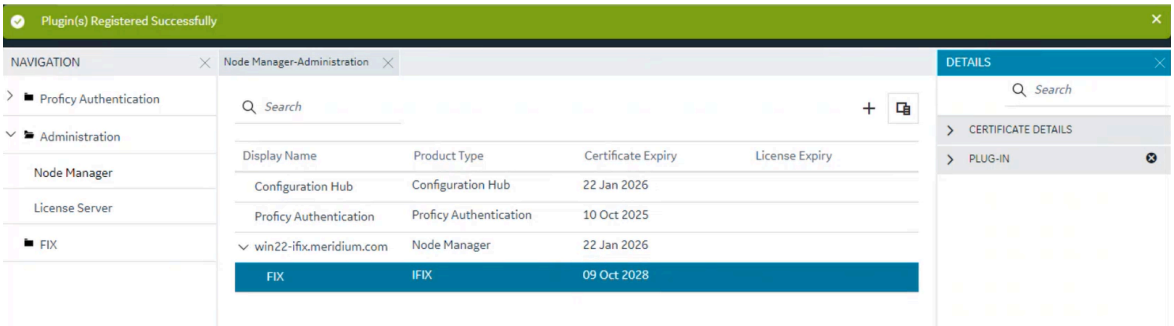
9. Enter the Host Name, Display Name and Port.
10. Click the Not Trusted link beside the certificate icon. The Certificate Details dialog will appear.
11. Click Trust.
12. Click Add. The iFIX plug-in will appear under the node manager, but not in the navigation panel.



13. Click

to open the Register Plug-in dialog.

14. Click Register. The iFIX plug-in will now appear in the navigation panel. Refresh the browser.



Login to Configuration Hub and Configure the User

You can now login to Configuration Hub with the **ch_admin** user. Use the client secret supplied when you installed Proficy Authentication as the password.

Add the **scada.fix.shared.APPLICATION_DESIGNER** group to the user for iFIX access in Configuration Hub access, and the **scada.fix_shared_IFIX_PROFICY_AUTH_ADMIN** group to provide access for to all iFIX features (iFIX administrator access).

Logout of Configuration Hub and log back in to start using iFIX features in Configuration Hub.

Descriptions of Fields Available in Registration Tool

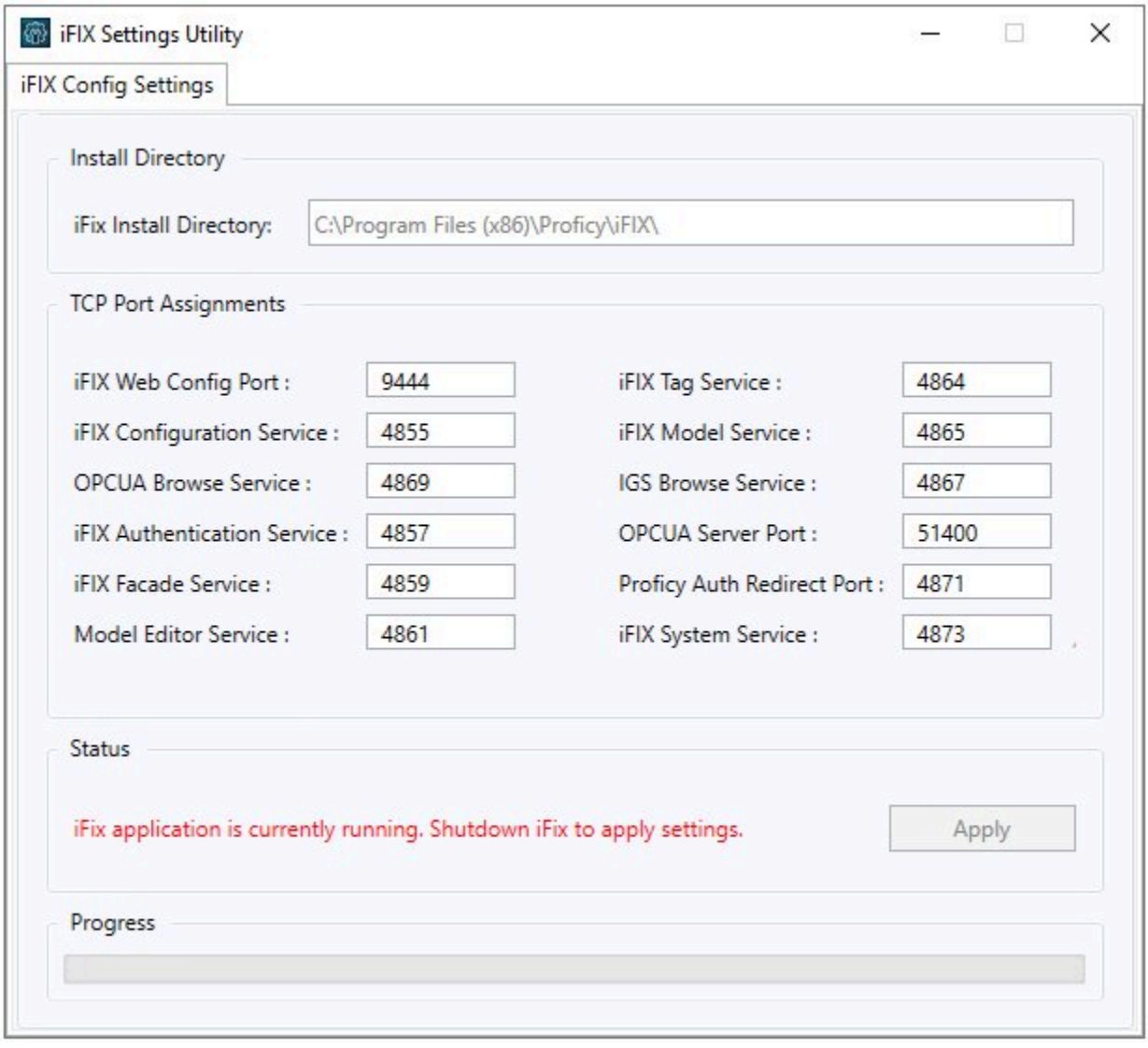
The following fields appear in the Configuration Hub Registration tool:

Field	Description
Server Name	The server's name for the Configuration Hub or Proficy Authentication server. When using a network domain, provide the full domain name. You must supply valid current credentials (Client ID and secret) to register.
Server Port	Displays the port associated with the Configuration Hub or Proficy Authentication server.
Client ID	Displays the Client ID for your Configuration Hub or Proficy Authentication server. The Client ID and Client Secret was created when you installed the Configuration Hub product.
Client Secret	The client secret associated with the Configuration Hub or Proficy Authentication server. The Client ID and Client Secret was created when you installed the product. You will need to enter the Client Secret if you want to change the server's name (update), unregister, or register your Configuration Hub web server.

Field	Description
	Note: If you forget your client ID or secret, you will not be able to register/unregister plug-ins with Configuration Hub or Proficy Authentication. In this case, you would need to reinstall Configuration Hub and/or Proficy Authentication and register all of all the plug-ins again in order to change them.
Use Configuration Hub Authentication Credentials for Proficy Authentication check box	Select this check box if you had entered same credentials (Client ID and Client Secret) for both Configuration Hub and Proficy Authentication during installation.
Update button	Click this button to save changes entered in this wizard. To save your changes, You must enter the Client ID and Client Secret information that you entered when you installed the product.
Register button	Click to register your Configuration Hub and Proficy Authentication server. This button is only available if the Configuration Hub or Proficy Authentication web server is in an unregistered state. To register Configuration Hub and Proficy Authentication , you'll need the Client ID and Client Secret information that you entered when you installed the product.
Unregister button	Click to unregister your Configuration Hub web server. This button is only available if the Configuration Hub or Proficy Authentication web server is in a registered state. To unregister Configuration Hub, you'll need the Client ID and Client Secret information that you entered when you installed the product.

Port Changes for iFIX after Configuration Hub Install

If you need to change the ports used by iFIX after install, use the **iFIXConfighubSettingsUtility.exe** utility found in the iFIX folder (by default this folder is: C:\Program Files (x86)\Proficy\iFIX) to reset them. This change must be done only when iFIX is NOT running.

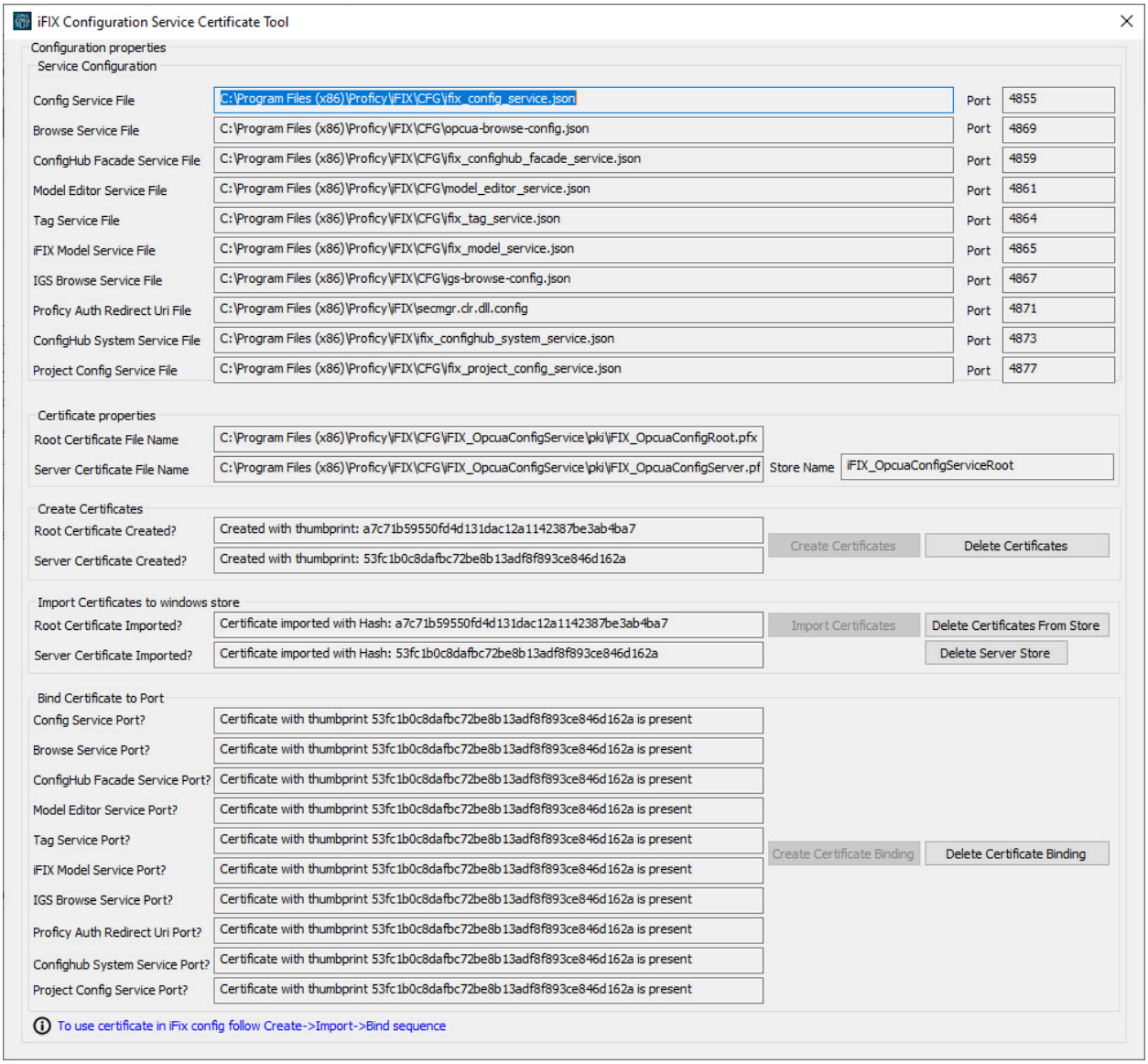


Note:
If you are planning to update iFIX Web Config Port, you must first unregister the iFIX Plugin with ConfigHub. If any of the other service ports are changed, then there is no unregister/register needed.

If the iFIX Web Config Port changed, then you must register the iFIX plugin again. See the iFIX Plugin Registration *(on page 268)* for more details.

With the exception of the iFIX Web Config and OPCUA Service ports, if any other service ports are changed, then you must run the **iFixConfigServiceCertTool.exe tool** (shown in the following figure) to bind the certificates to the changed ports found in C:\Program Files (x86)\Proficy\iFIX. Please note that this utility must be run as an administrator only.

If any ports are changed, the iFIX Configuration Service Certificate tool shows the updated ports as “No certificate binding is not present.” Click the Create Certificate Binding button to add the necessary port binding.



After the binding is complete, close the utility and restart iFIX. The changed ports then will be used by the iFIX.

Upgrading Configuration Hub

If upgrading from a previous version of Configuration Hub, be sure to clear your browser cache and re-register the iFIX Plugin (click the Register iFIX Plugin on the desktop). Be aware that iFIX Security must be enabled to access. For steps, refer to iFIX Plugin Registration *(on page 268)*.

Also, be aware that the `scada.fix.shared.APPLICATION_DESIGNER` group is not available by default when you upgrade from iFIX 2022 or earlier. You must manually create the group with the required iFIX application features, or update your existing groups to include the following iFIX application features (if you want users in these groups to have access to and use Configuration Hub):

- Database Block Add-Delete
- Database Manager
- Database Reload
- Database Save
- Security Configuration
- System Configuration

If you create a new user in Proficy Authentication Security, be sure to add these two groups in order to get full access to iFIX in Configuration Hub: scada.project.admin and iFIX_PROFICY_AUTH_ADMIN.

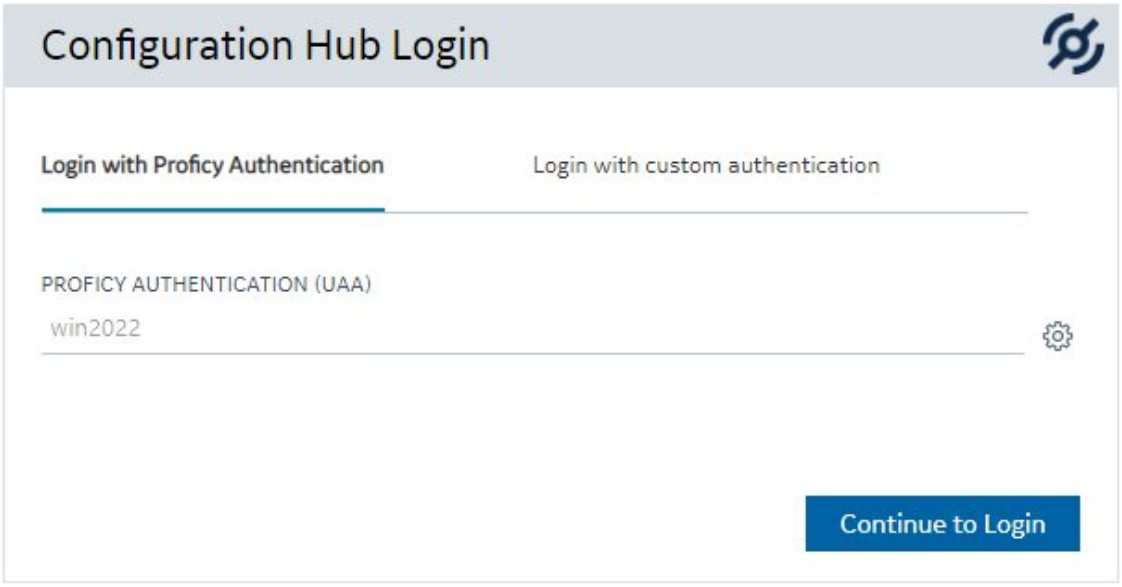
Access iFIX Web Configuration

1. In the iFIX WorkSpace, select the Applications ribbon and click Configuration Hub Or, on the desktop, click the Configuration Hub icon ().

> **Note:**
> If using the desktop icon, confirm that iFIX is running, and you are logged into iFIX.
>
> When using the iFIX plugin, the login page expects credentials that are configured for Proficy Authentication. The user should be a member of the **scada.fix.shared.APPLICATION_DESIGNER** group in Proficy Authentication to have all the permissions necessary to use Configuration Hub.

The Configuration Hub Login screen appears.

2. Select **Continue to Login**.



The iFIX Authentication screen appears.

3. Enter the Proficy Authentication user name and password, and click Sign In.

> **Note:**
> If this is your first time logging in, use the **ch_admin** login with the client secret that you entered during install as the password. The ch_admin is the default user.

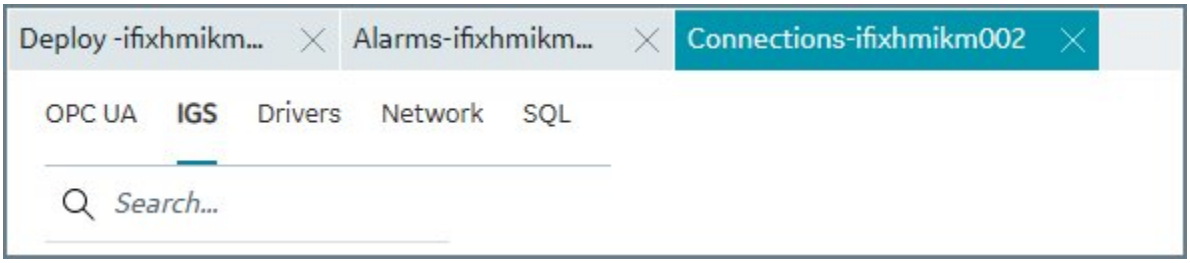
After a successful authentication, the Configuration Hub screen appears.

Connections

Connections Overview

Connections are where you establish connections to the data you want to collect and bring into iFIX. Current available options are OPC UA, IGS, Driver, Network, and SQL.

In the Navigation panel, select your iFIX node, and then Connections, and then select the option at the top of the main panel.



For more detailed information, see:

- OPC UA Connections *(on page 278)*
- IGS Connections *(on page 290)*
- Drivers *(on page 298)*
- Network Connections *(on page 300)*
- SQL Connections *(on page 307)*

OPC UA Connections

OPC UA Connections

iFIX offers an OPC UA Client Driver option that allows you to connect to OPC UA Servers.

Overview of OPC UA Connections

If you want to connect to an OPC UA server from a newly created project in Configuration Hub, make sure that the certificate is to the server is validated, else the test connection with the OPCUA server will fail.

To use this feature in Configuration Hub:

- Your running iFIX SCADA node must be licensed for this option.
- You must have valid certificate for iFIX to act as an OPC UA server or as OPC UA client.

Steps to Add a Certified Connection

To create a new connection with a valid certificate:

1. Start iFIX.
2. Open the **SCU app** and verify that the OPC UA Client was added in the SCADA Configuration. If not, add the OPC UA Client Driver to SCADA node (in the SCADA Configuration dialog box).
3. Save the SCU file and restart the iFIX.
4. From the iFIX WorkSpace, on the Applications tab, select the **OPC UA Configuration** tool.
5. Click the **Certificate** tab.
6. Select the **Generate Self-Signed** certificate button.
7. Click **Save and Exit**.
8. From Configuration Hub, in the Navigation panel select the node, the project, and then **Connections**.
9. Select the **OPC UA** connection option.
10. Click **New** to create a new connection. Type in the unique server name and the end point URL of your OPC UA Server. For example: opc.tcp://myserver:51400/.

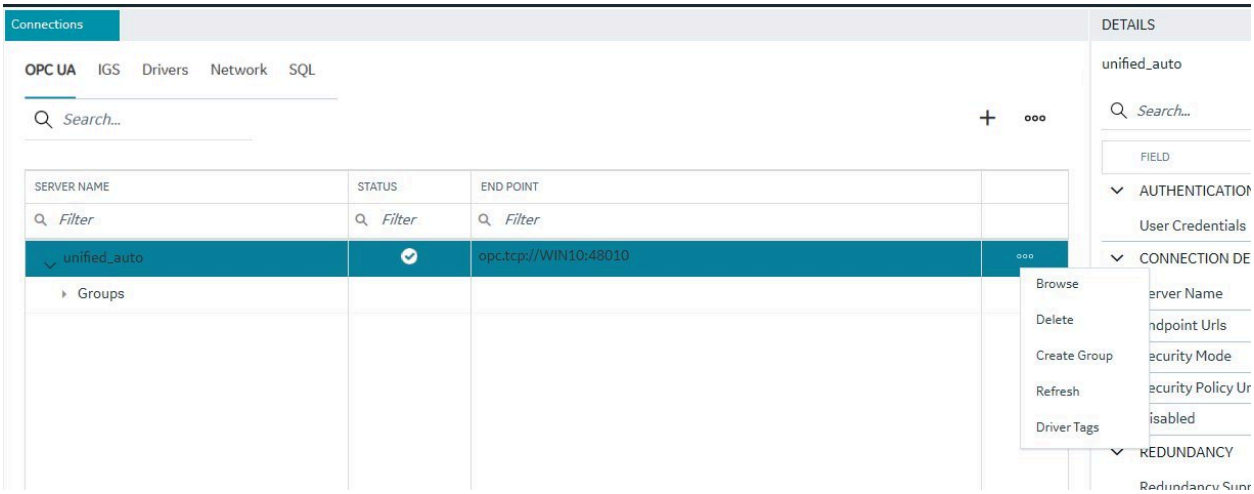
    

    Note:
    If you do not know this path and port, you can obtain it by opening the iFIX WorkSpace, selecting the Application tab, and clicking OPC UA Configuration. When the tool opens, on the Server tab, you can find the Endpoint URL and copy it so that you can paste it in the Endpoint URL field in The New OPC UA Server Connection dialog box in Configuration Hub.

11. Click **Test** to test the connection. The connection should succeed.
12. After you get a successful connection, click **Create** to add the connection.

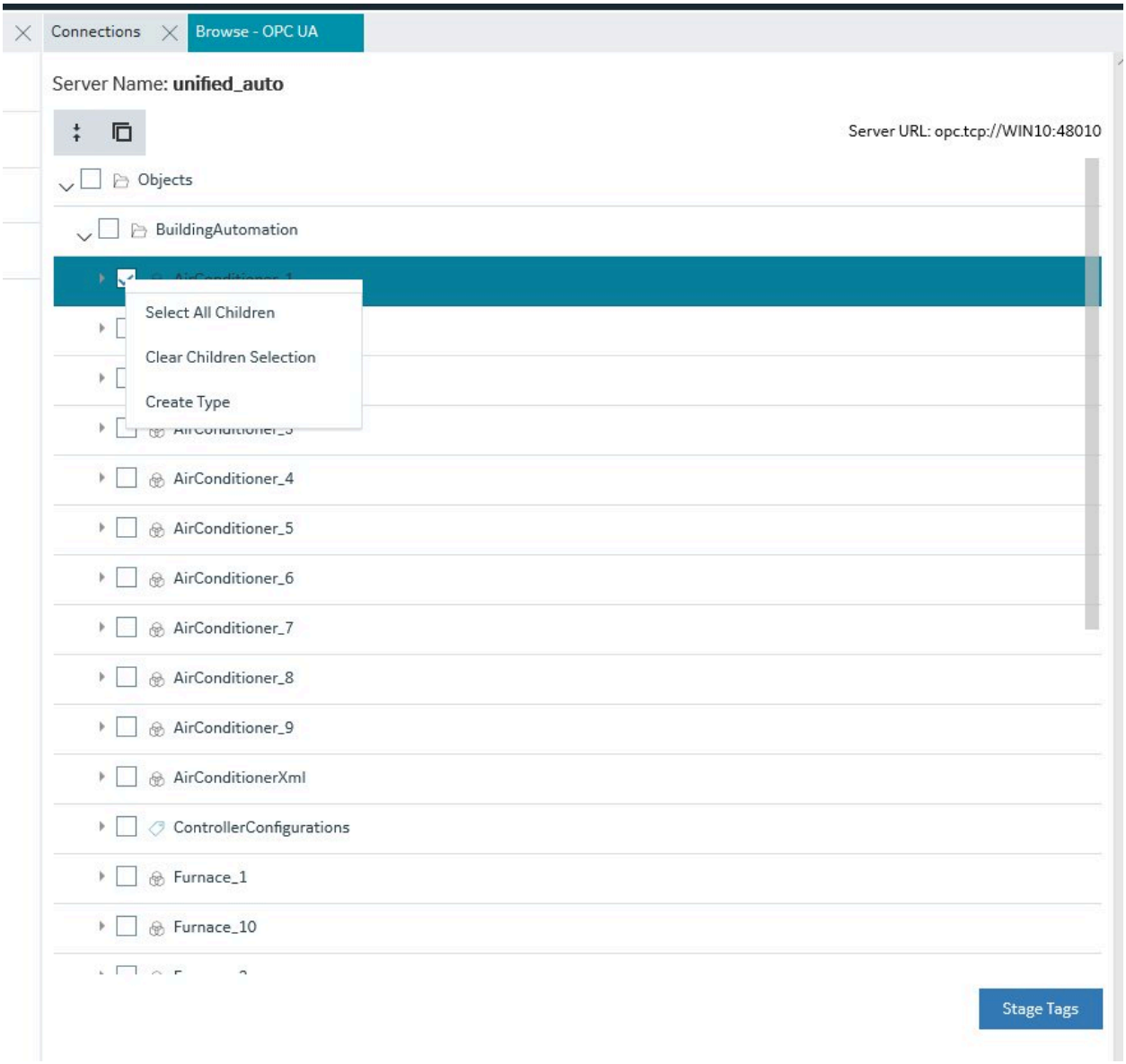
Working with OPC UA Connections

After your connection is created, it appears in the table. Click the ellipsis (...) to the right of your entry to interact with the server.



From the popup menu, select Browse to browse the hierarchy available in the OPC UA Server.

From here you can select individual tags to populate your iFIX Database, or select higher level object and create a new object type for your iFIX model. For example, you can right-click on an Object row to bring up a sub-menu, and then select Create Type.



Server Management

OPC UA Server connections can be edited using the Details panel. After selecting a server configuration in the Connections panel, the Details panel populates the server connection information.

The ENDPOINT URL field takes the host name or IP address and port used to connect with the OPC UA Server. For example: opc.tcp://MyServer:51400/. The format of this URL (with the machine name, IP address, or fully qualified domain name) is defined on the OPC UA Server.

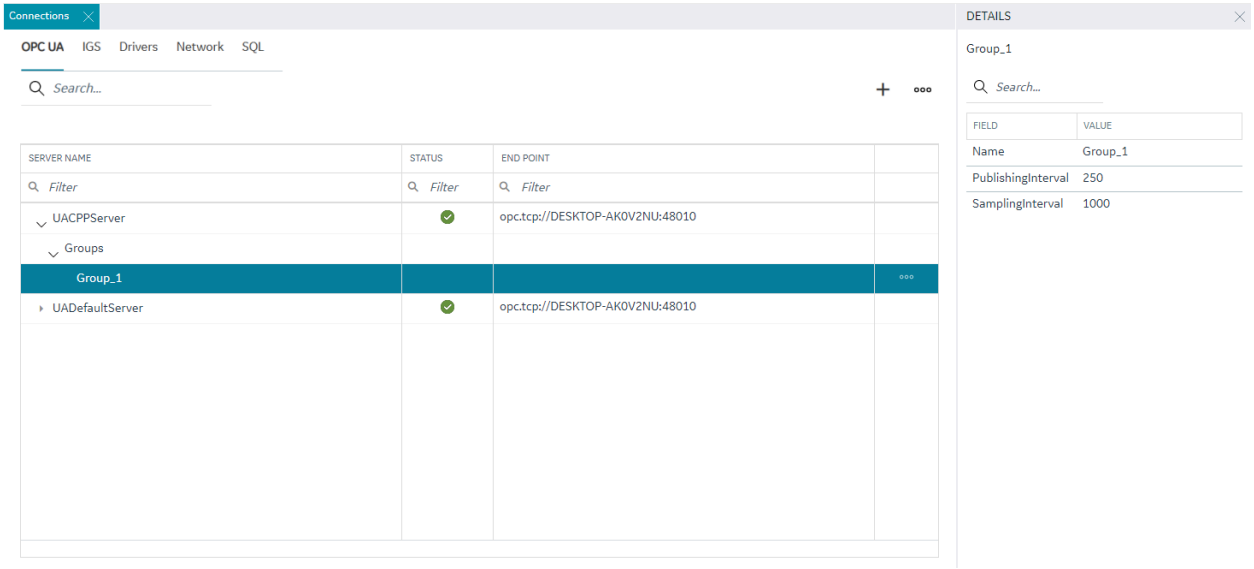
The authentication type can be set to Anonymous or UserName/Password. It is recommended that you select UserName/Password to provide the highest level of security. Anonymous does not provide any protection for accessing data or logging.

If the UserName/Password option is selected, enter the user name and password to connect to the OPC UA Server.

After editing the server details, the Save button on the toolbar is enabled to indicate that the Connections panel has changes to be saved. On clicking the Save button, the changes made to server connections are persisted until the changes are published to the iFIX node.

In addition to editing a server connection, the connections panel supports creating groups under the server connections and deleting them. When an OPC UA server connection is created, a default group is created.

Groups under a server connection allows you to configure the publishing interval, and sampling interval. Any application requesting data from the OPC UA Server uses group names to access items in the group. Group names can be up to 19 alphanumeric characters including underscores (_) and hyphens (-).

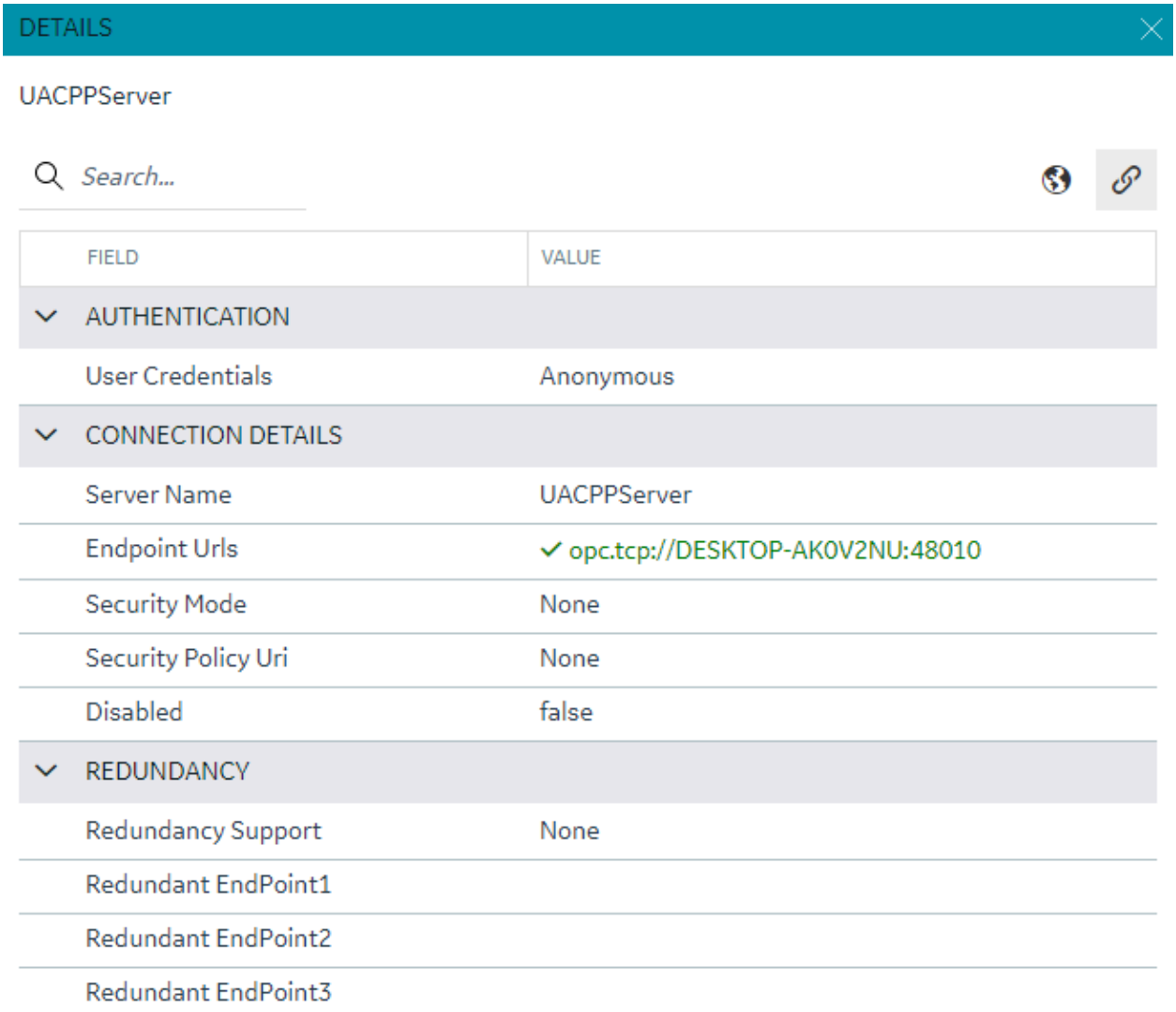


Testing Connections

Test Connection function is provided on the OPC UA server connection's Details panel. The test connection function is initiated from the toolbar button  .

The test makes an attempt to reach to the end point URL provided in the Connection Details panel and on successful connection comes back with the test status and populates into the end point URL field with a check mark; on failure to connect the same field is highlighted in red with failure a reason.

The following figure displays a successful test.



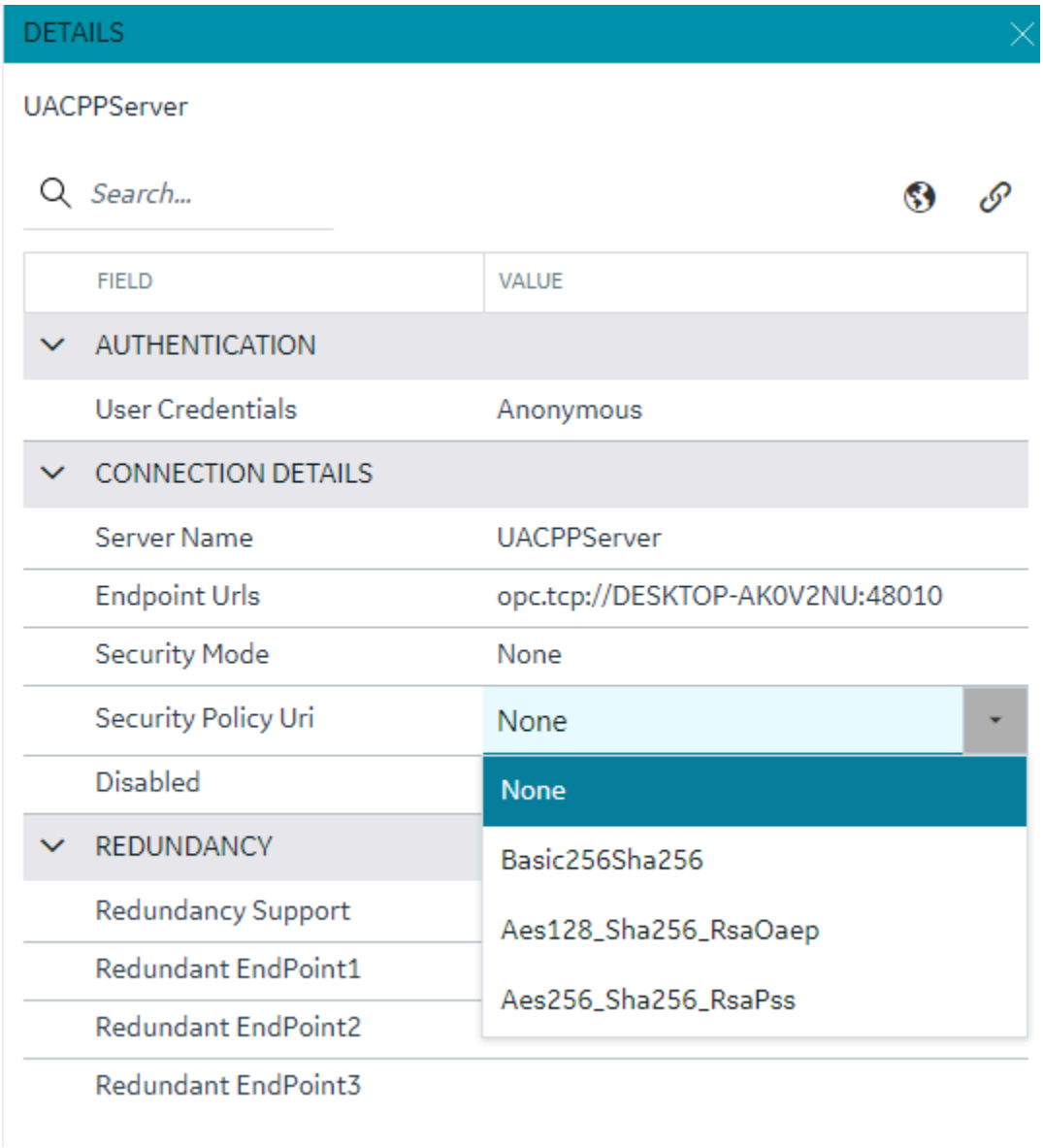
Policy Browse

OPC UA servers are configured with specific security mode and policy. The Details panel of a server connection provides a toolbar button to browse policies .

On execution of this function, the configured Security mode and Policies from the server are browsed and populated into the respective fields in the Details panel.

Select a Security Model and Security Policy to apply to this connection: Basic128Rsa15, Basic256, Basic256Sha256, Aes128_Sha256_RsaOaep, or Aes256_Sha256_RsaPss.

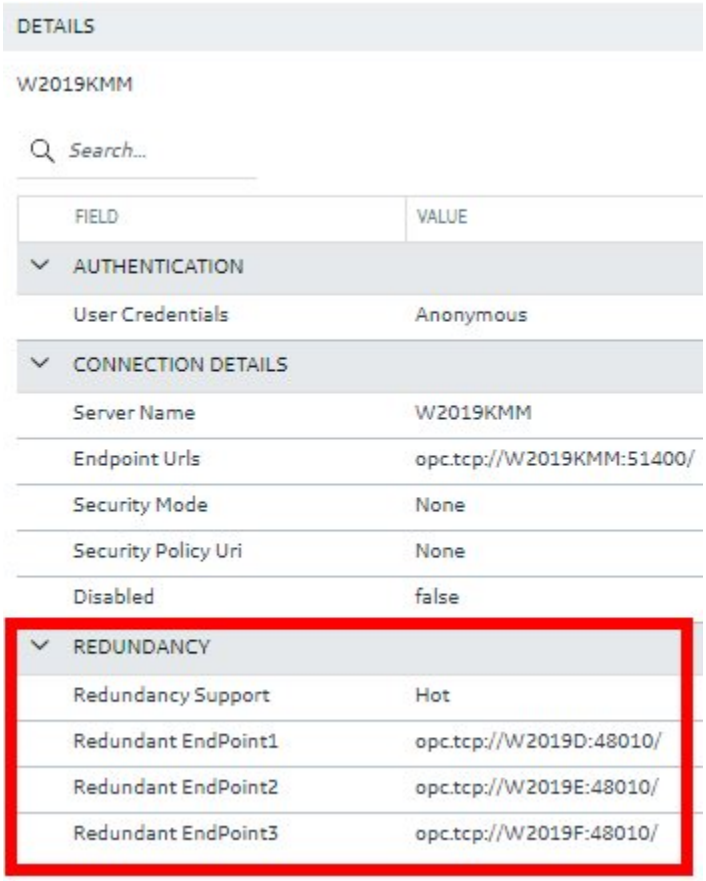
Note:
If you are not sure what to select for Security Mode and Security Policy or simply want to test a connection, select None. Be sure that you go back and change this setting later, however, to ensure you have adequate security enabled for your connections.



Note:
For the connection to work for any other security policy other than None, you will have to ensure the certificates are properly trusted between the iFIX client and the OPC UA server you are communicating to. See the iFIX help for use of the OPC UA tool in iFIX.

Redundancy Configuration

You can specify the redundancy settings for your OPC UA Server connection, if you have this feature enabled on your OPC UA Server. Scroll to view the Redundancy settings on the Details panel for selected OPC UA server Connection tab, as show in the following figure. You can configure Cold, Warm, or Hot redundancy.



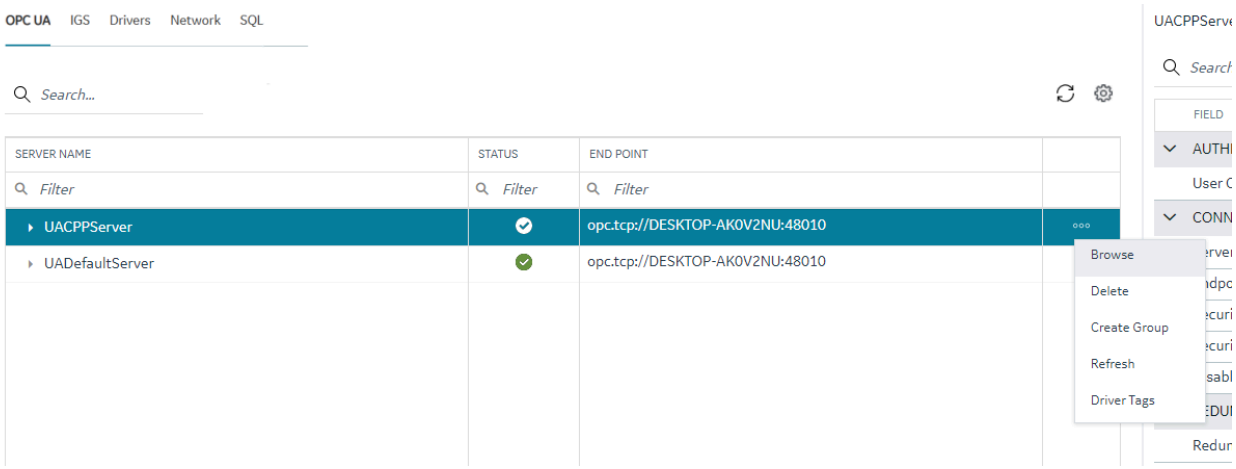
According to the OPC Foundation: Cold redundancy requires an OPC UA Client to reconnect to a backup server after the initial server has failed. Warm redundancy allows a client to connect to multiple servers, but only one server will be providing data values. In Hot redundancy, subscriptions are created in multiple servers but only 1 server is active and providing data to the client at a time.

You can configure up to 3 backup servers (endpoint URLs).

Browse and Create iFIX Tags for OPC UA

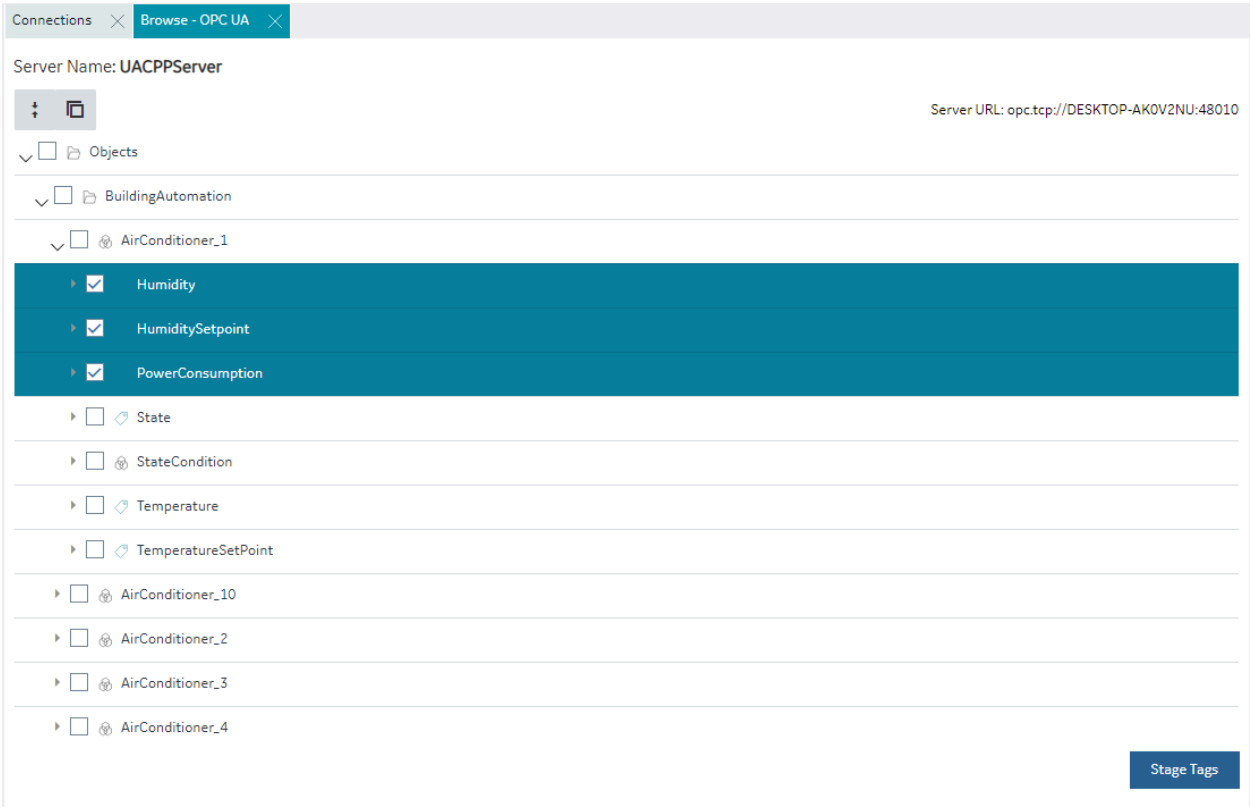
An OPC UA server connection can be browsed to navigate through the address space and select content to create tags into the active iFIX database.

The OPC UA server connection browse is provided through the context menu on the selection of the server connection row.

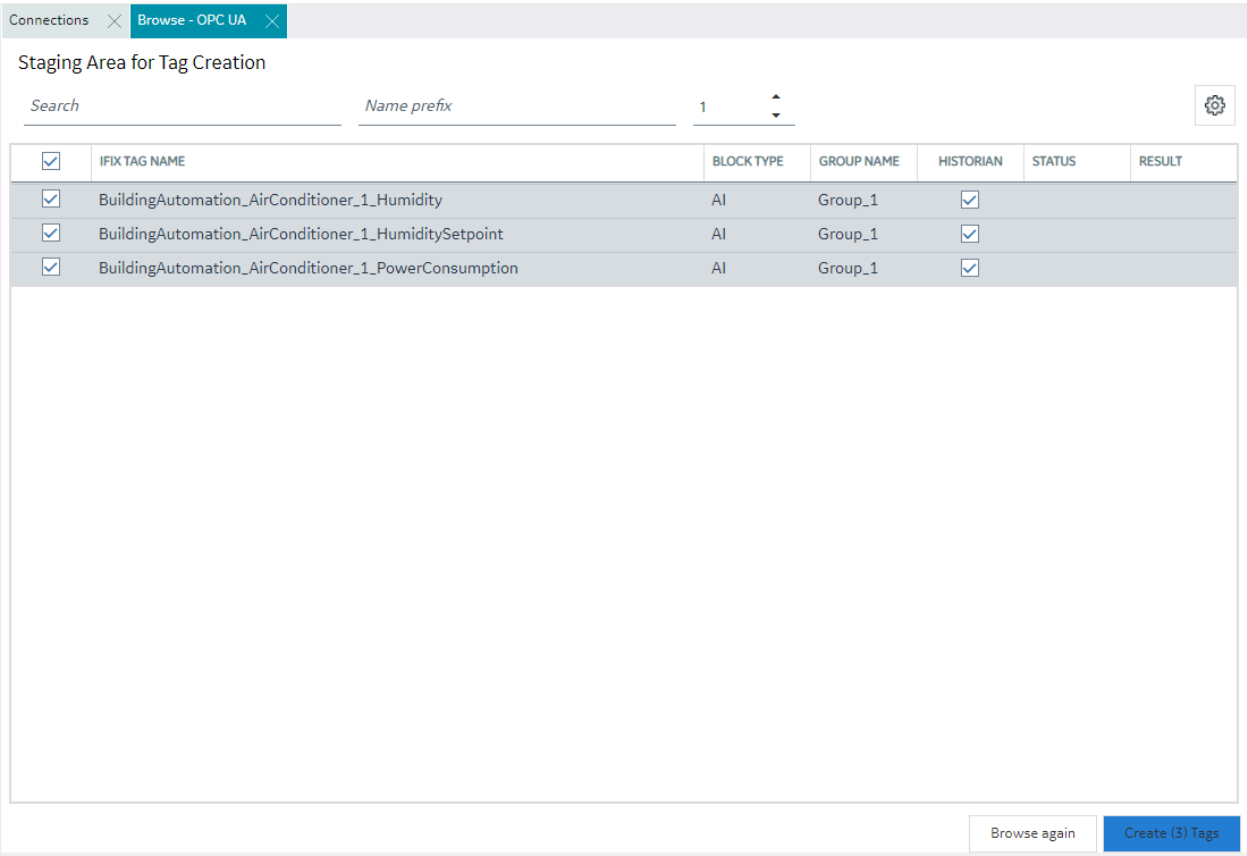


The first step in the tag creation process is to browse the OPC UA Server device and select the tags from the browse content. A parent node's right-click menu can be used to selected bulk child tags for creation.

The next step is to stage the tags and preparing the tags for creation into the iFIX database.



The staging environment allows for modifications to tag names, selection of iFIX block type (default mapped on staging) and selecting a tag for Historian collection.



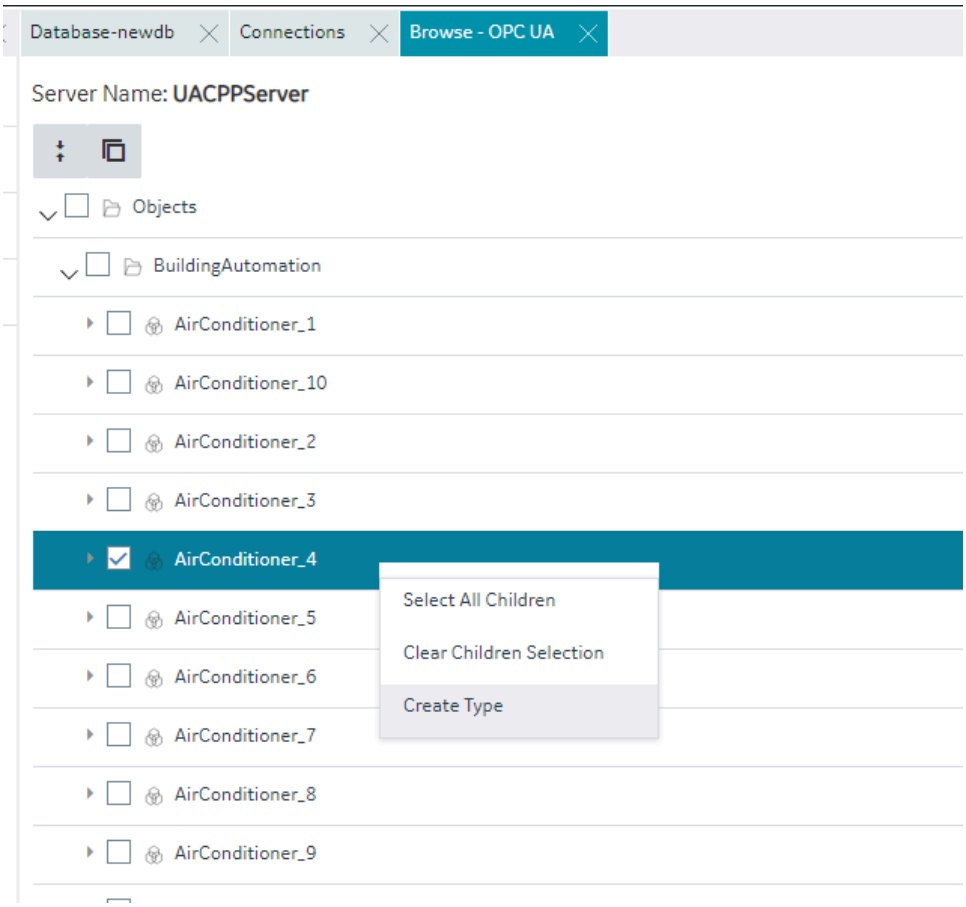
You can automatically generate one or more tags at a time by browsing the OPC UA Server device.

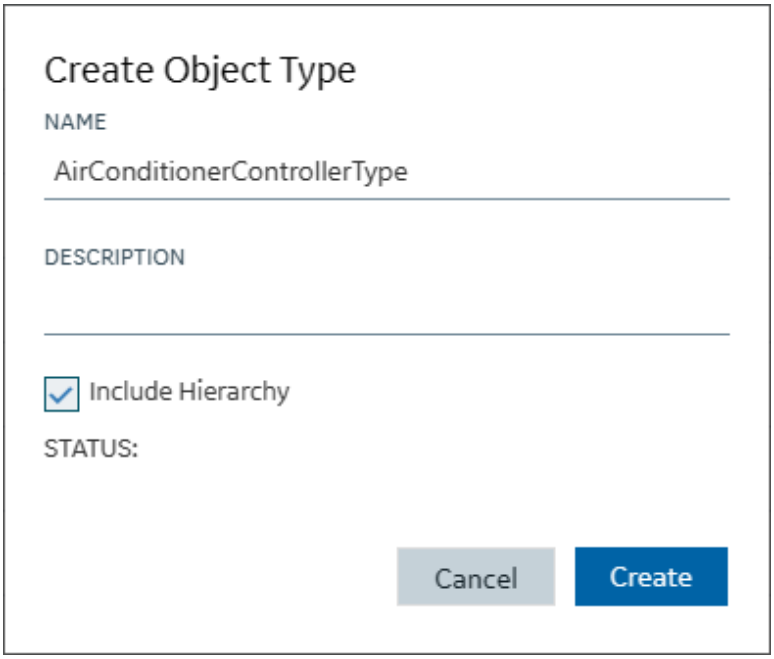
Browse and Create Types for OPC UA

Using the browse functionality on an OPC UA server, you can create new model types from existing types, replicating their variables and if required, any child objects or variable groupings. This allows you to quickly populate the properties of an object type, without having to configure them separately.

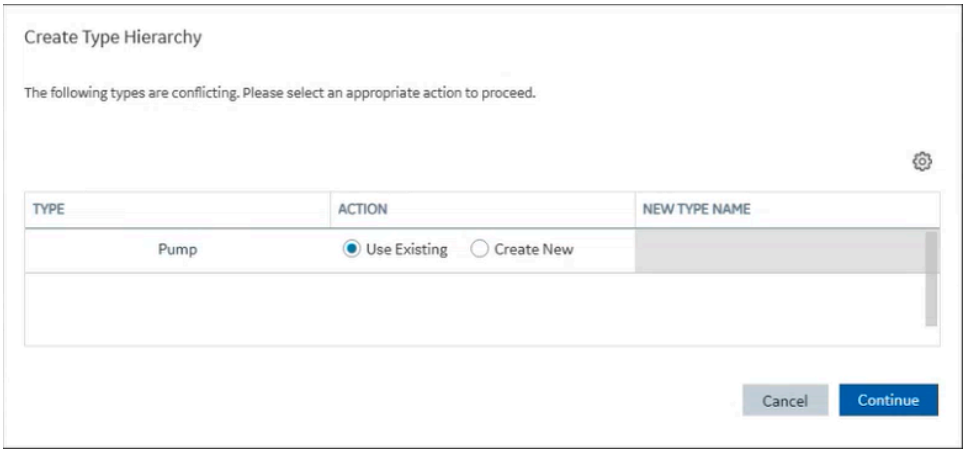
To create a new model type based on an existing type:

1. Right-click the existing model type from the **Browse** tab and select **Create Type** from the menu that appears. The **Create Object Type** dialog will appear.





2. Enter a unique **NAME** for the model type.
3. Enter a **DESCRIPTION** for the model type (optional).
4. The **Include Hierarchy** checkbox provides two options:
    - If left unchecked, only the variables at the level directly below that of the object type would be copied. Any contained assets (child objects or variable groupings) will be ignored when the new model type is created.
    - If the box is checked, all contained assets from all sub-levels, will also be created in the new model type.
5. Click **Create**.
    - If there is a conflict with one of the copied types (that is, it already exists within another asset), the **Create Type Hierarchy** dialog appears.



At this point you must choose to either:

- **Use Existing**: reuse the type in the new model.
- **Create New**: if the existing type does not represent the new asset (for example if it has different variables), give it a new, unique name in the **NEW TYPE NAME** field.

- Click **Continue**.
- Click **Close** in the **Create Object Type** dialog.

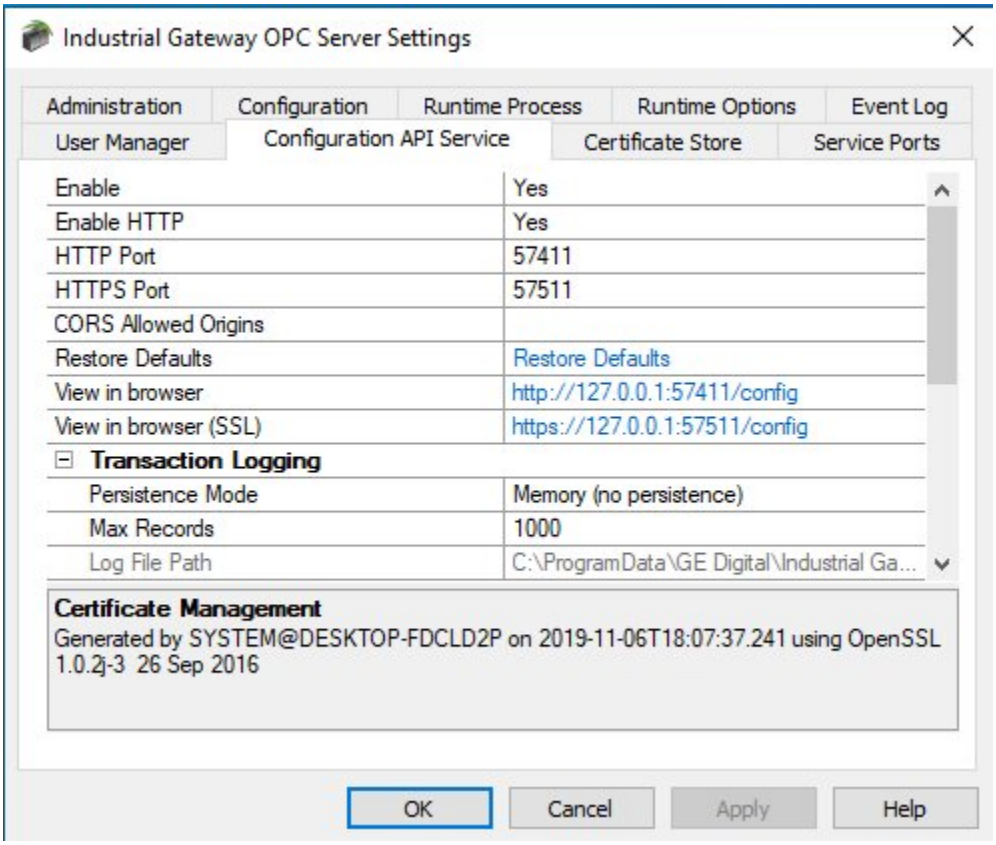
IGS Connections

IGS Connections

Overview

To use the IGS feature in Configuration Hub, you must:

- Have a license for IGS: Industrial Gateway Server - Basic or 100.
- Have the IGS driver added to the iFIX SCU.
- Have the correct settings for the IGS Configuration API Service: both the **Enable** and **Enable HTTP** fields are set to Yes. Restart the driver after you configure these settings.



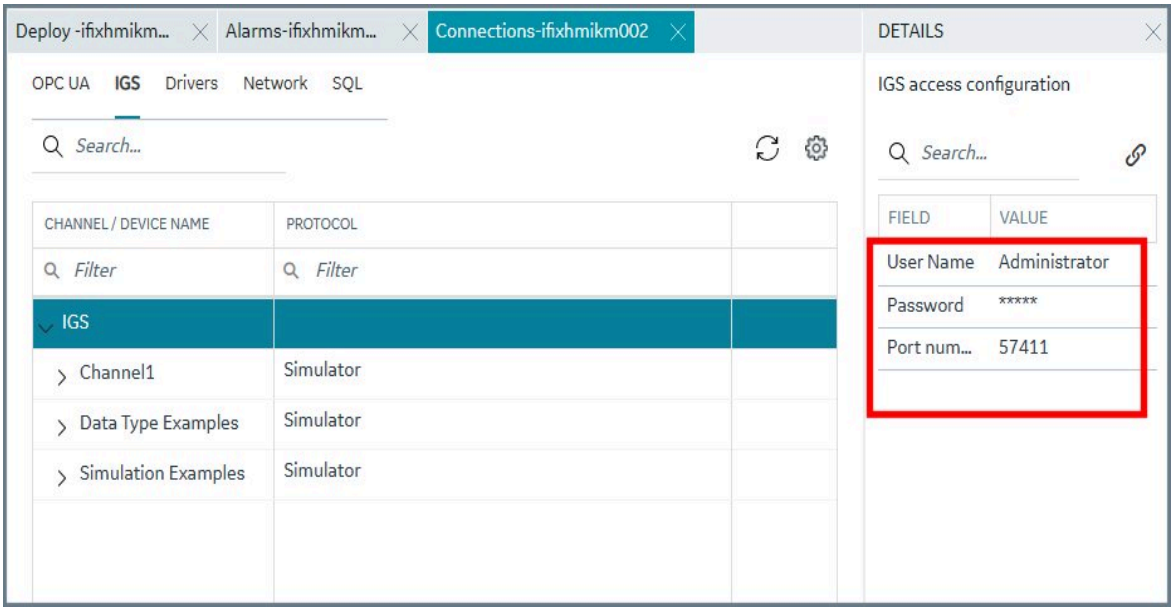
Steps to Add the IGS to the iFIX SCU

Start iFIX.

1. From the iFIX WorkSpace ribbon, select Applications and then select the SCU (System Configuration Utility) option. The SCU appears.
2. On the Configure menu, select SCADA. The SCADA Configuration dialog box appears.
3. In the I/O Driver Name field, click the browse (…) button. The available driver dialog box appears.
4. Select the IGS driver, and click OK.
5. Click Add to add the driver.
6. Click OK. A message appears that the database named “DATABASE” does not currently exist.
7. Click Yes to continue.
8. On the File menu, click Save to save the SCU file.
9. Restart iFIX.

Steps to Enable IGS Settings

1. In the Windows system tray, select the IGS Server icon.
2. Right-click and select Settings. The Industrial Gateway OPC Server Settings dialog box appears.
3. Select the Configuration API Service tab.
4. Set the 'Enable' and 'Enable http' fields to YES.
5. Restart the IGS Driver.
6. Open Configuration Hub.
7. From the Navigation panel, click FIX and then Connections.
8. Select the IGS option, and then inspect the settings.
9. If the IGS is configured with a user name and password, select the IGS connection, and then enter the user name and password for your IGS server (as shown in the fields displayed in the following figure) and then click **Save**. (If you do not configure a user name and password, the default user name is Administrator and the password is left blank.)

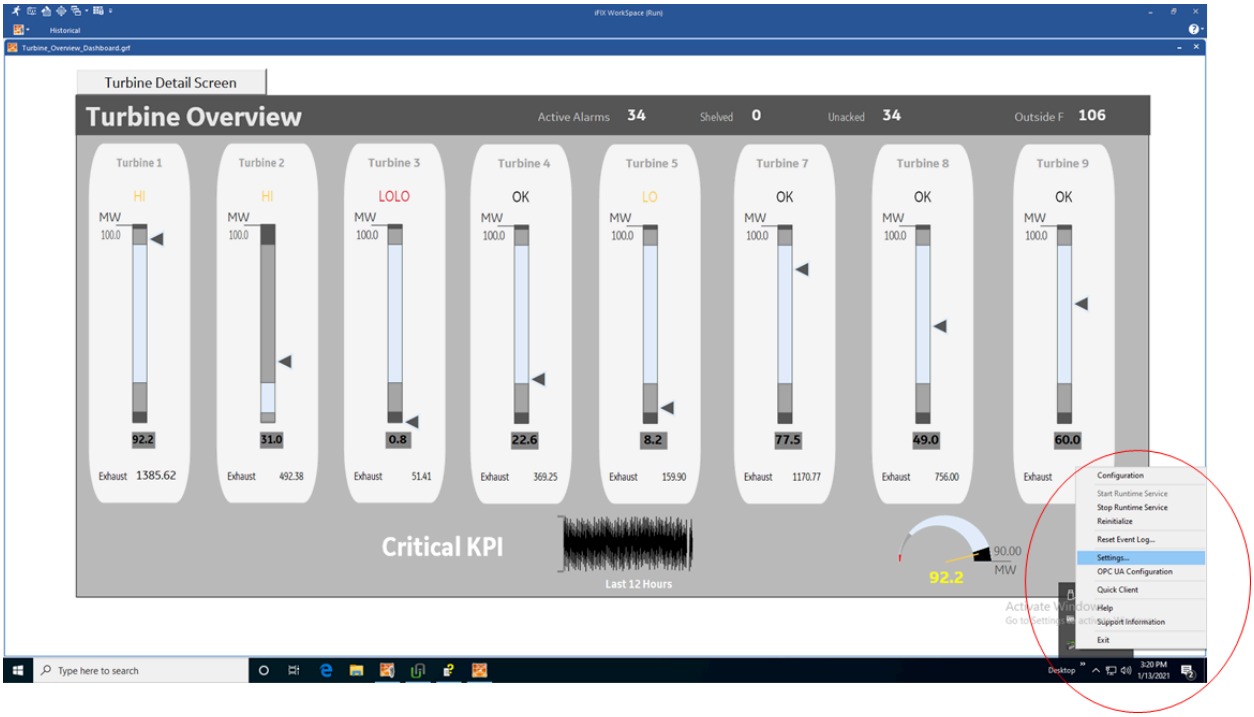


Tip:
If you need to troubleshoot IGS issues, you can find the IGS log file (igs-browse-config.log) located in the C:\Program Files (x86)\Proficy\iFIX\ folder, by default.

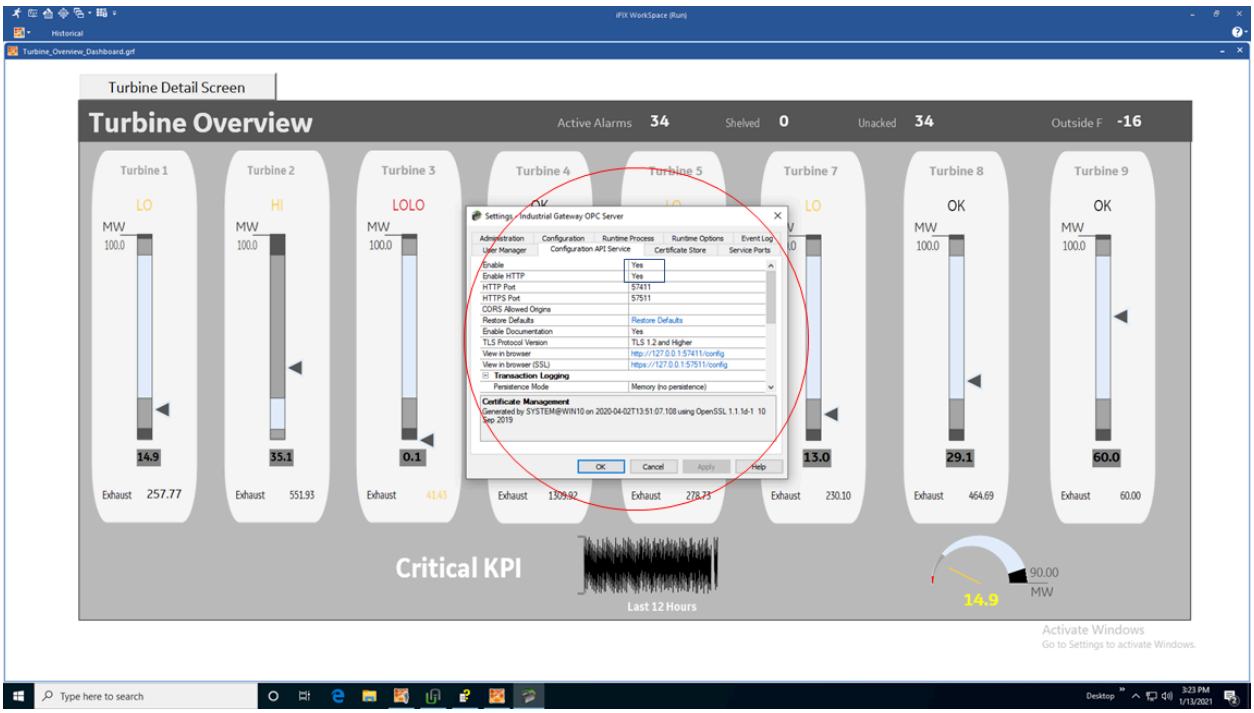
You can now configure channels/devices in the IGS (devices must be added to show Server details), and then Configuration Hub should display the configured channels/devices.

Configuration Example

The following example shows how to access the Settings for the IGS.



This is the Settings screen for the IGS driver:



Prerequisites for IGS

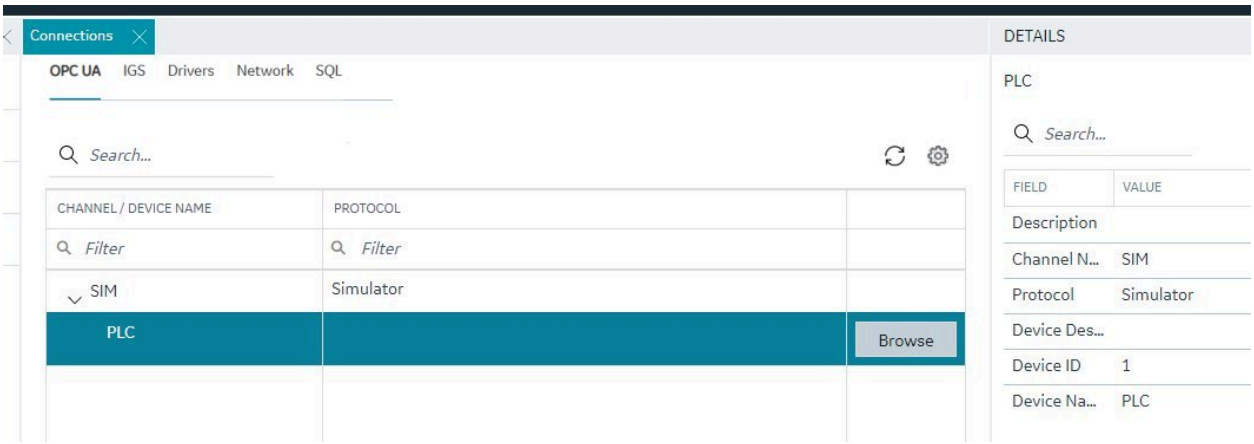
Prerequisites for the IGS driver include:

- Only IGS version 7.6 and onwards will be supported.
- Your license must be for IGS: Industrial Gateway Server - Basic or 100.
- In the IGS Administrator on the Configuration API Service, both Enable and Enable HTTP must be set to Yes.
- You must specify the proper user name and password in the Details panel of the IGS Connection screen in Configuration Hub in order to make the connection.
- The IGS driver must be added to iFIX in the SCU.

Getting Started with the Browse Tree for IGS

If you have an active IGS Project, it will appear in the table.

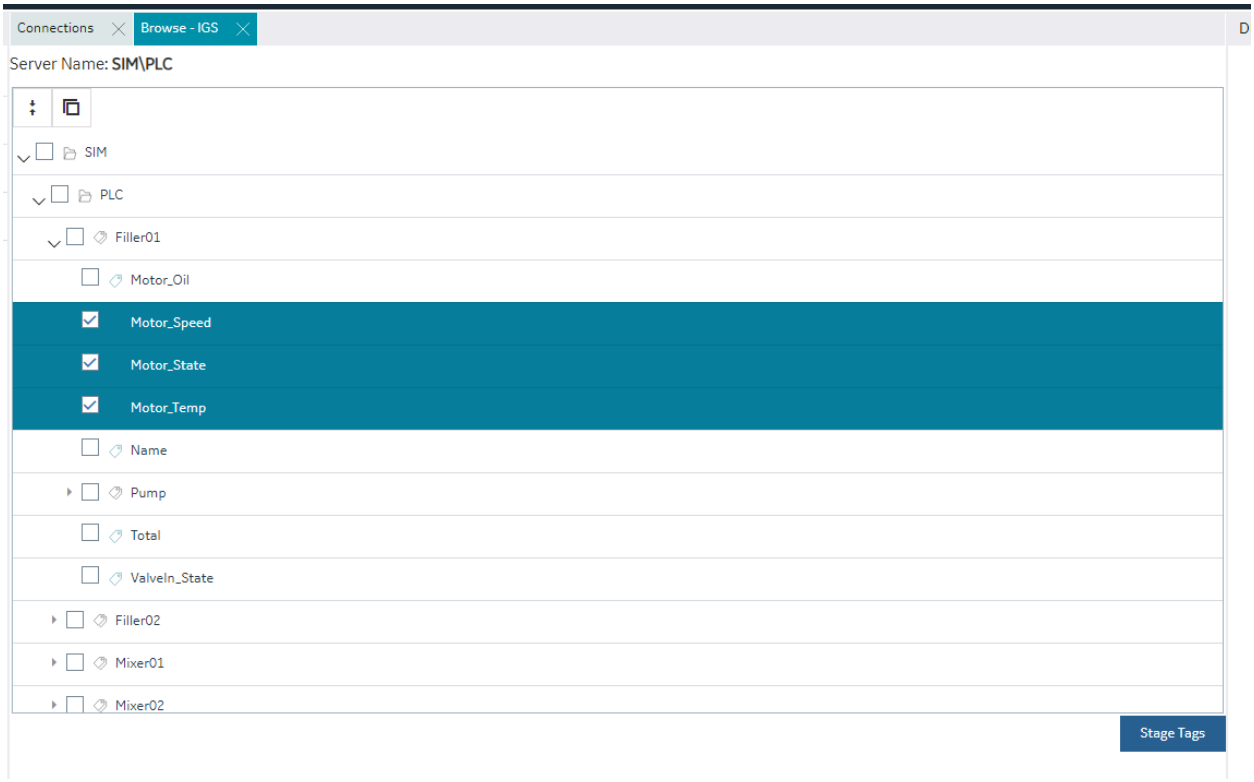
Select Browse to browse the hierarchy of channels and devices available in the IGS Server.



Browsing IGS Channels and Devices

The IGS tab in the connections panel displays the configured channels in the table. The channel can be expanded to access the devices configured under the channels. On selection of a device, the menu offers a browse command.

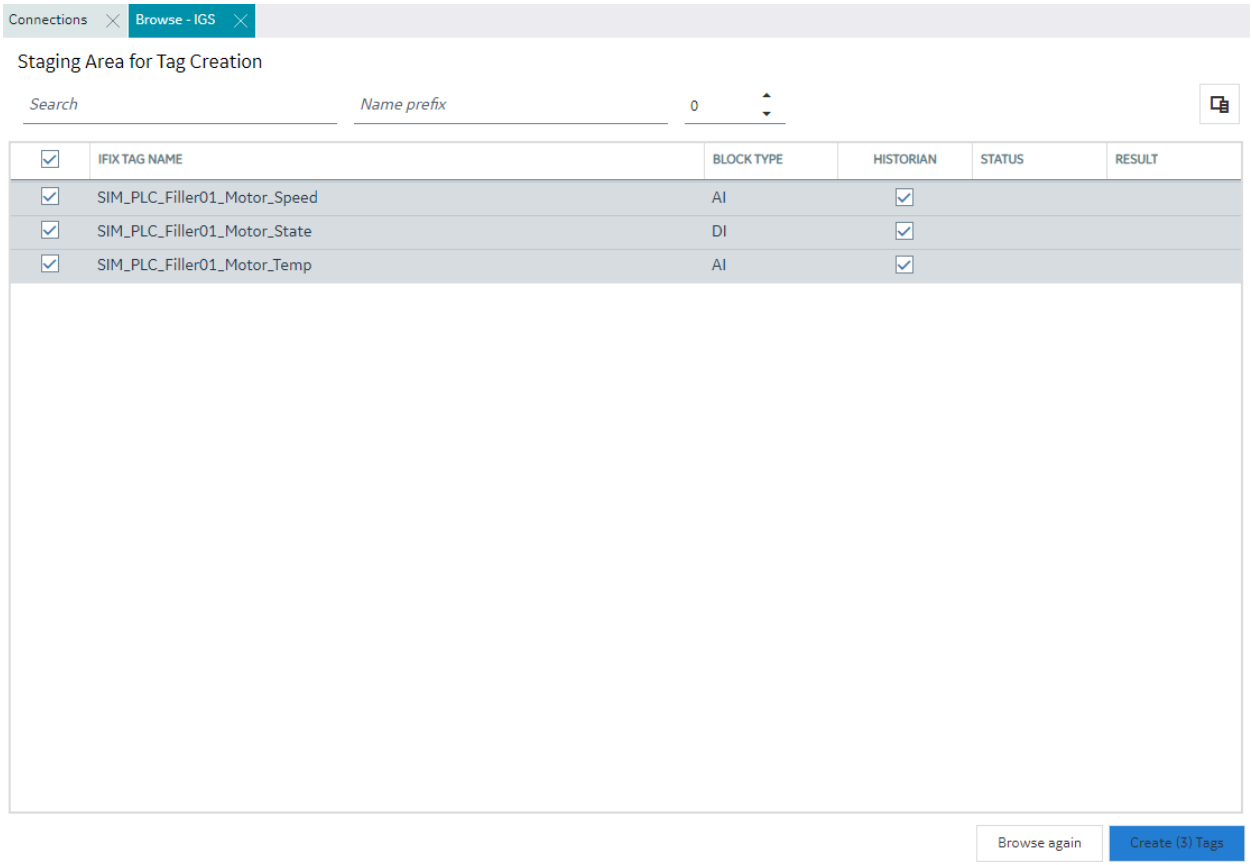
The configuration content of a device is populated into a new panel, the panel displays the selected channel/device and shows the tags/tag groups configured in the device. The tag groups can be expanded to navigated to the further levels of hierarchy.



Browse and Create Tags for IGS

The IGS browse panel shows the content of the IGS channel/device. Individual tags or a tag group can be selected to create as iFIX tags. Right-click menu on the tag groups provides a bulk selection option to select all the tags under the tag group. On selection of the tags and clicking of the Stage Tags option, the tags are staged for the next step in tag creation process.

The staging environment allows for selection of iFIX block type (default mapped on staging) and selection of Historian collection option for the tag. Additionally, you can add a prefix and reduce the hierarchical levels of the tag names.

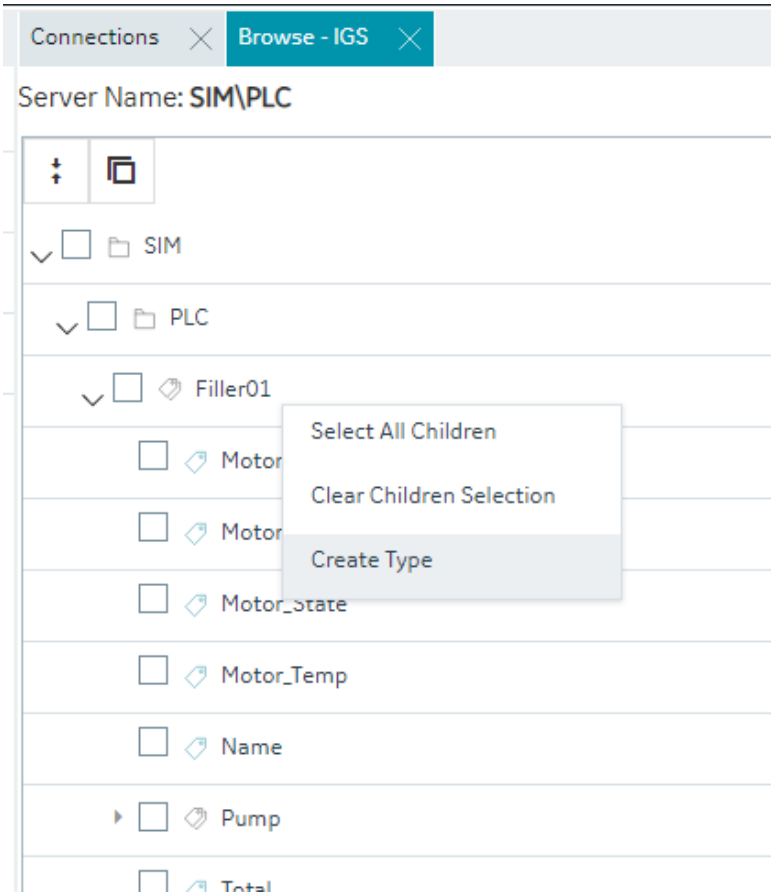


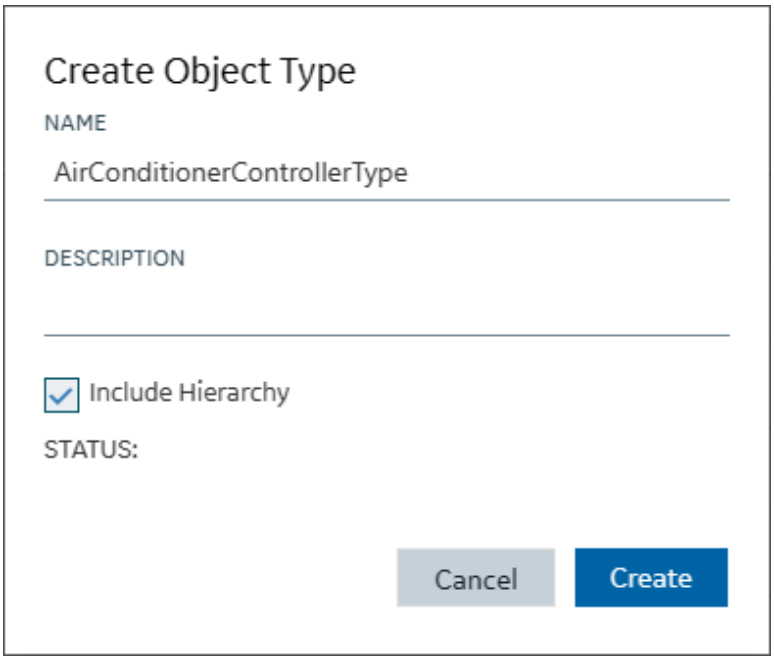
Browse and Create Types for IGS

Using the browse functionality on an IGS server, you can create new model types from existing types, replicating their variables and if required, any child objects or variable groupings. This allows you to quickly populate the properties of an object type, without having to configure them separately.

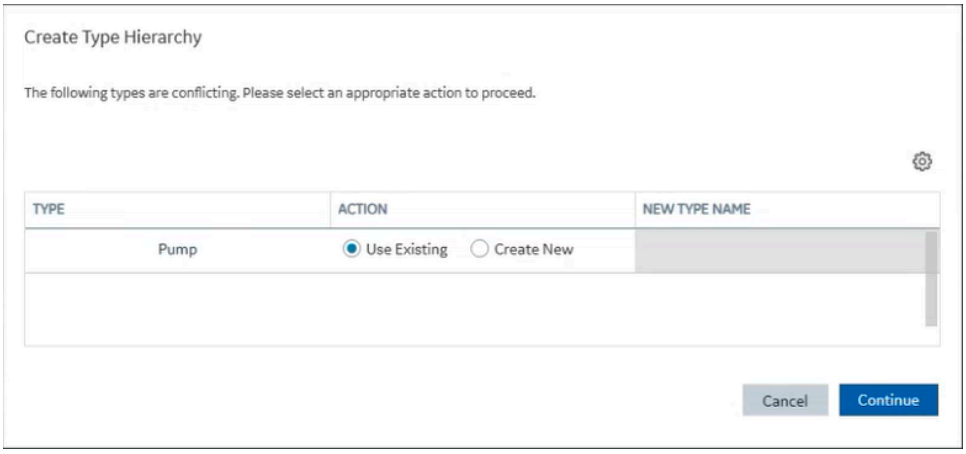
To create a new model type based on an existing type:

1. Right-click the existing model type from the **Browse** tab and select **Create Type** from the menu that appears. The **Create Object Type** dialog will appear.





2. Enter a unique **NAME** for the model type.
3. Enter a **DESCRIPTION** for the model type (optional).
4. The **Include Hierarchy** checkbox provides two options:
    - If left unchecked, only the variables at the level directly below that of the object type would be copied. Any contained assets (child objects or variable groupings) will be ignored when the new model type is created.
    - If the box is checked, all contained assets from all sub-levels, will also be created in the new model type.
5. Click **Create**.
    - If there is a conflict with one of the copied types (that is, it already exists within another asset), the **Create Type Hierarchy** dialog appears.



At this point you must choose to either:

- **Use Existing**: reuse the type in the new model.
- **Create New**: if the existing type does not represent the new asset (for example if it has different variables), give it a new, unique name in the **NEW TYPE NAME** field.

- Click **Continue**.
- Click **Close** in the **Create Object Type** dialog.

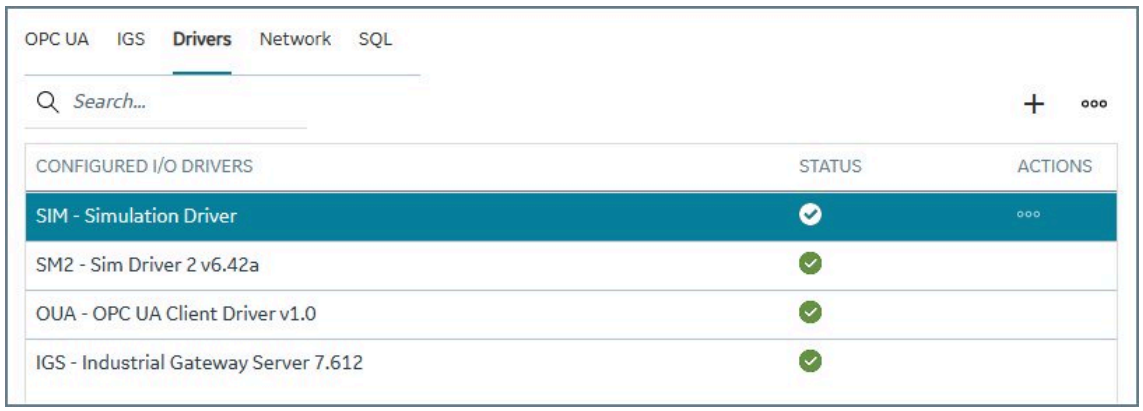
Drivers

The Drivers area lists the available drivers that you can add to your SCADA configuration.

View the Configured Drivers

To view the configured drivers for your SCADA system:

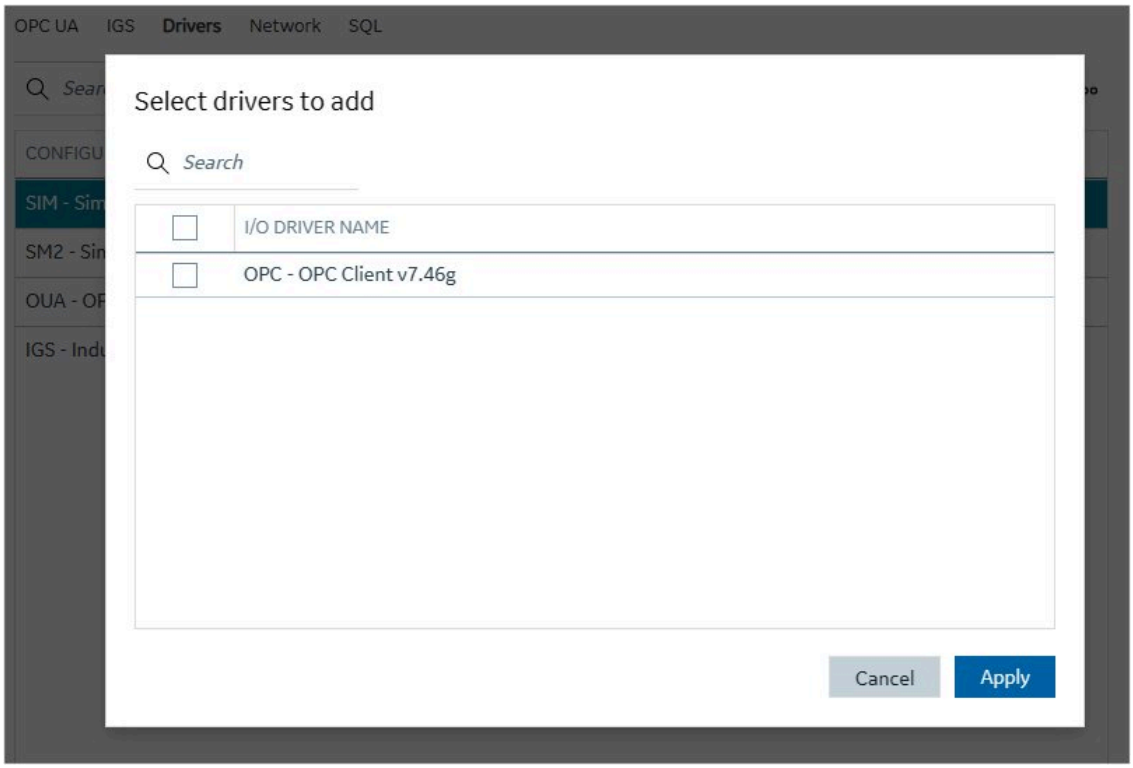
1. On the Configuration Hub Navigation panel, select your iFIX node, and then **Connections**.
2. Click **Drivers**. The following screen appears in the Connections panel. The grid displays a list of I/O drivers configured on this node, and their status.



Add a Driver

To add a driver in Configuration Hub:

1. Click the plus (+) icon at the top of the Configured I/O Drivers grid. The Select Drivers to Add dialog box appears. Only the drivers that are available to add (and have previously been added through the iFIX SCU application) appear in this list.
2. Select the check box of the driver that you want to add.
3. Click **Apply**.



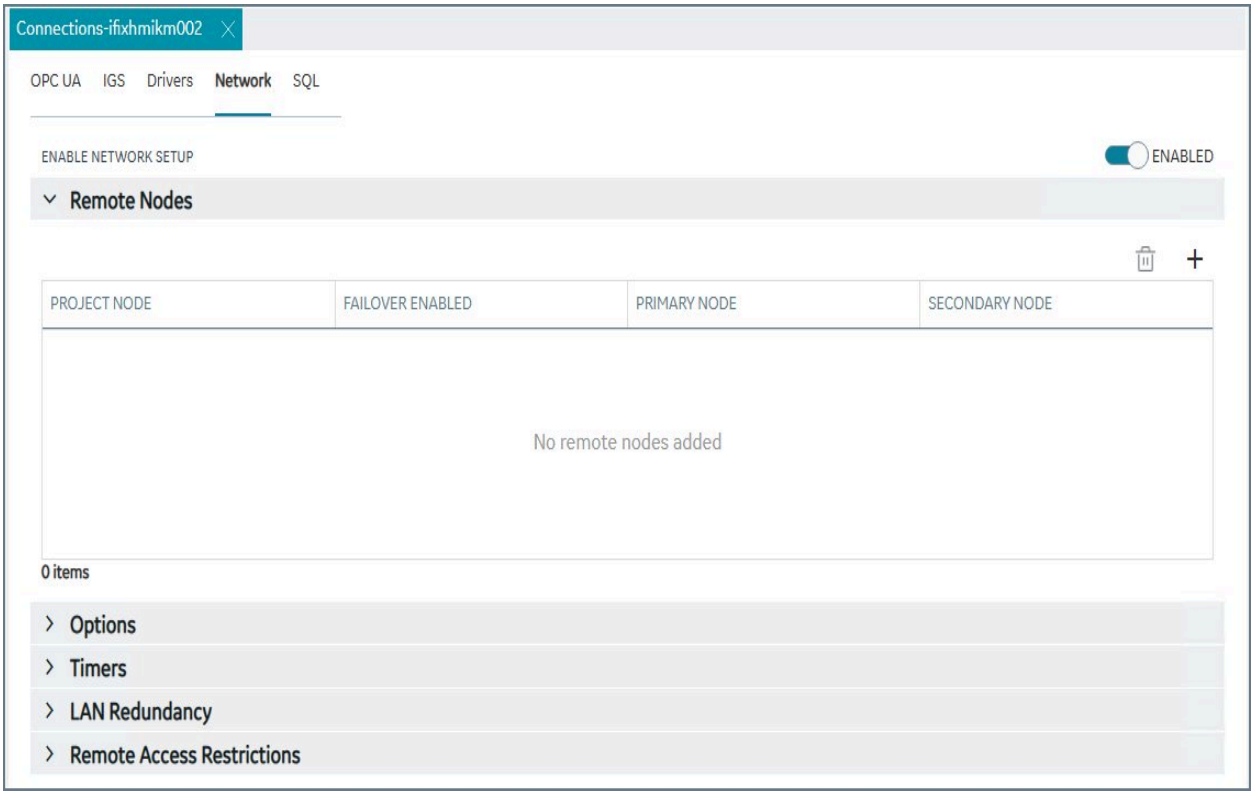
Network Connections

The Network Connections area allows you to view and control network communications for this node.

Overview

To access the Network Connections:

1. In the Navigation panel, select your iFIX node, project, and then **Connections**.
2. Click **Network**. The following screen appears in the Connections panel.



Network Connections Details

The tables that follow describe the details that you can configure or view.

Table 1. Remote Nodes

Field	Description
Project Node	Displays the iFIX project node name.
Description	Provides the description of the node.
Primary Node	Specifies the name of the primary node. The node name you enter cannot already be listed in the Configured Remote Nodes list box. You also cannot enter the name of a node that is already entered as a primary node.
Secondary Node	Allows you to specify the name of the standby node. The node name you enter cannot already be listed in the Configured Remote Nodes list box.

Table 1. Remote Nodes (continued)

Field	Description
	You also cannot enter the name of a node that is already entered as a standby node.
Failover Enabled	Describes whether iFIX Enhanced Failover is enabled. The default is No.
Reset to Defaults button	Allows you to reset the remote node network timers to their default values.
Use Network Timers	Allows you to enable the use of network timers on the remote node. The default is Yes.
Keep Alive	Allows you to specify the amount of time that, if no activity has occurred over an established connection, a View client waits before sending a heartbeat message. The default value for this field is 20 seconds.
Send	Allows you to specify the amount of time that a View client waits for a request to the SCADA server to be acknowledged. If this timer expires, the session ends. The default value for this field is 30 seconds.
Receive	Allows you to specify the amount of time that a View client waits for a reply from the SCADA server. When running iFIX over TCP/IP, the effective session timeout values is either the Send timer or the Receive timer, whichever is greater. If this timer expires, the session ends. The default value for this field is 60 seconds.
Inactivity	Allows you to specify the amount of time that, if no data activity has occurred over an established connection, a View client waits before removing the dynamic connection from the list of outgoing con-

Table 1. Remote Nodes (continued)

Field	Description
	nections. If this timer expires, the session ends. The default value for this field is 300 seconds.

Table 2. Options

Field	Description
Resolve Dynamic Connections	Allows you to establish dynamic connections on this node. Disable this option if you want to connect only to nodes configured in the Configured Remote Nodes list. This feature is not available if you are setting up a stand-alone node. The default is Disabled.
Enforce Trusted Computing	Allows you to establish trusted computing on this node. Disable this option if you want to use legacy network computing. This feature is not available if you are setting up a stand-alone node. When Trusted Computing is enabled, a valid password must be configured and confirmed before the changes will be saved. The default is Disabled.
Set Up Network Password	Allows you to set a password to create a site-specific certificate for network security. The default password (INETWORK) allows legacy network security to continue. This field is not available if you are setting up a stand-alone node.

Table 3. Timers

Field	Description
Keep Alive	Allows you to specify the amount of time that, if no activity has occurred over an established connection, a View client waits before sending a heartbeat message.

Table 3. Timers (continued)

Field	Description
Range (10-129 seconds)	The default value for this field is 20 seconds.
Send	Allows you to specify the amount of time that a View client waits for a request to the SCADA server to be acknowledged. If this timer expires, the session ends.
Range (5-120 seconds)	The default value for this field is 30 seconds.
Inactivity	Allows you to specify the amount of time that, if no data activity has occurred over an established connection, a View client waits before removing the dynamic connection from the list of outgoing connections. If this timer expires, the session ends.
Range (50-32000 seconds)	The default value for this field is 300 seconds.
Receive	Allows you to specify the amount of time that a View client waits for a reply from the SCADA server. When running iFIX over TCP/IP, the effective session timeout values is either the Send timer or the Receive timer, whichever is greater. If this timer expires, the session ends.
Range (5-120 seconds)	The default value for this field is 60 seconds.

Table 4. LAN Redundancy

Field	Description
Reset to Defaults button	Allows you to reset the network timers to their default values.
Enable LAN Redundancy	Allows you to enable the LAN redundancy feature on the node. The default is Disabled.
Available Paths list	Displays a list of available network paths, and their network status.

Table 5. Remote Access Restrictions

Field	Description	Default
Accept Unknown Host	Select this option to allow the SCADA node to accept connections from any computer. When the parameter is disabled, access is restricted to the iClients (View) you specify.	Disabled
Remote Viewers list	The list of remote viewers that can Accept Unknown Hosts.	None
Accept Unauthorized Writes	Select this option to allow the SCADA node to log all unauthorized write attempts from the iClients.	Disabled
Remote Viewers list	The list of remote viewers that can Accept Unauthorized Writes.	None
Log Unauthorized Writes	Select this option to enable the logging of failed writes.	Disabled

Special Considerations for SCADA Enhanced Failover

This topic covers iFIX Enhanced Failover special considerations. It does not cover High Availability for Configuration Hub servers. iFIX Enhanced Failover should not be used on a node participating in a High Availability *(on page 110)* setup.

If using Enhanced Failover, you must be in Maintenance Mode to make changes to your Database or Model in Configuration Hub. Maintenance Mode allows you to temporarily suspend synchronization between the two SCADA nodes in an Enhanced Failover pair. This allows you to add or modify groups and tags in your iFIX database while the Scan, Alarm, and Control (SAC) program is running. When you enter Maintenance Mode, SCADA synchronization temporarily stops; synchronization between the SCADA pair is suspended. After Maintenance Mode is enabled, you can make changes to the database on the primary node.

Additionally, all changes to a Failover pair's Database or Model must be made on the Primary node. Changes made to a Failover pair's Database or Model on the Secondary node cannot be published.

Every time you make a change in the configuration and publish, the data is reloaded in the configuration and the driver is restarted. This is important to know if you are making changes on a live system. You will NOT need to restart iFIX after you make any changes in the Configuration Hub. However, after you exit Maintenance Mode, you will need to stop and restart the driver from Mission Control on the secondary in order to pick up the configuration changes.

Using Configuration Hub with iFIX Enhanced Failover

In an Enhanced Failover setup, both the Primary and Secondary Nodes can register and login to Configuration Hub. See iFIX Plugin Registration *(on page 268)*.

1. Once registered, you can login and work with Configuration Hub on the Primary and Secondary nodes.
2. When making changes to the Database or Model you must be in Maintenance Mode, and those changes must be made on the Primary node.
3. Changes made while in Maintenance Mode need to be published in Configuration Hub to the iFIX node.
4. Once all changes to the Database or Model have published, disable Maintenance Mode in the Primary Node. This will allow the Primary Node to synchronize changes with the Secondary Node.

Deleting Servers or Groups

Be aware that when the iFIX SCADA Enhanced Failover pair has the OPC UA Driver configured, any server or group delete operation in the Configuration Hub UI on the Primary will not be deleted on Secondary after the maintenance mode synchronization happens. The Secondary SCADA continues to retrieve data since the server and/or group still exist on the Secondary. As a workaround, manually delete the server and group files from the secondary SCADA, since you cannot run Configuration Hub on the Secondary SCADA. The UA client will continue to receive data from these servers/groups until the OUA driver is restarted (via Mission Control or iFIX restart) on the Secondary SCADA, forcing the driver to reload the configuration from disk, which will no longer have those servers/groups.

Server and Group configuration files are found in the PDB\iFixUaClient folder, in Servers and Groups folders, respectively. Each server and group have its own file. In each of these folders, compare the contents on the Primary node to those on the Secondary. If a file exists on the Secondary but not on the Primary then open the file in a text editor and verify that it is a server or group that was deleted from the Primary. If so, delete that file from the Secondary.

For all other operations, the synchronization works as expected such as: Server Create, Driver tag deletions or updates, Group updates, and so on.

Notes on Certificate Management

When the iFIX SCADA is part of an Enhanced Failover pair and we have enabled the OPC UA Driver on the SCADA, each physical SCADA needs to establish trust with the configured OPC UA Server separately. After both SCADAs can communicate to a remote OPC UA Server individually using their certificates, you can then bring the iFIX SCADAs up as failover pair. Be sure to confirm that you can communicate individually first.

Special I/O Addresses

There are special I/O addresses in iFIX that are very helpful in a Redundancy Configuration for the OPC UA Client. Using the ConnectionStatus and EndpointUrl addresses, you can see the overall connected status of a (logical) server, and the endpoint it is currently using for data.

SQL Connections

The SQL Connections area in Configuration Hub allows you to control how the iFIX SQL option communicates with a server containing a relational database.

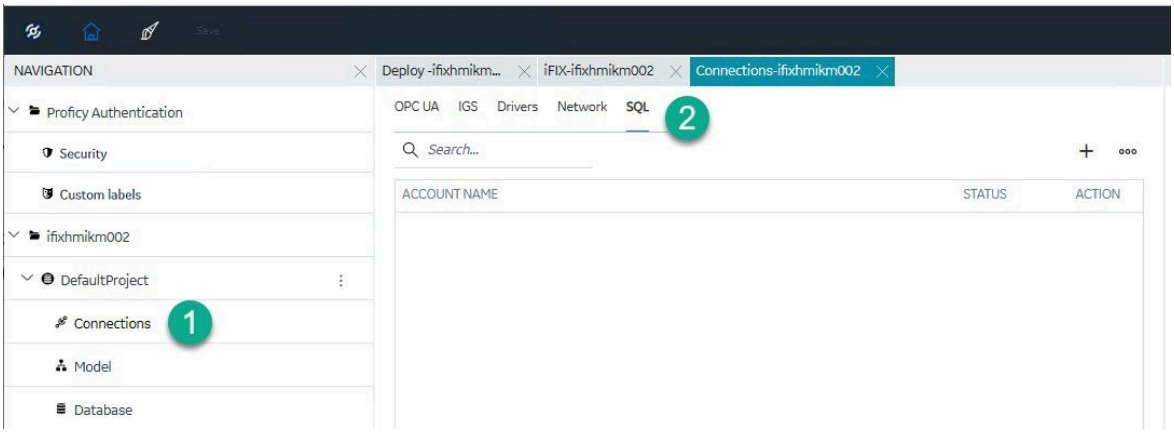
Overview

The SQL Connections let you identify the:

- Type of database to which the SQL option connects (for example, Oracle, or Access).
- User name for the account to which you log into on the relational system.
- Password for the account.
- ODBC data source name.

Add a SQL Connection

1. In Configuration Hub, in the Navigation panel, select your iFIX node, and then Connections.
2. Next, click SQL. The following screen appears in the Connections panel.

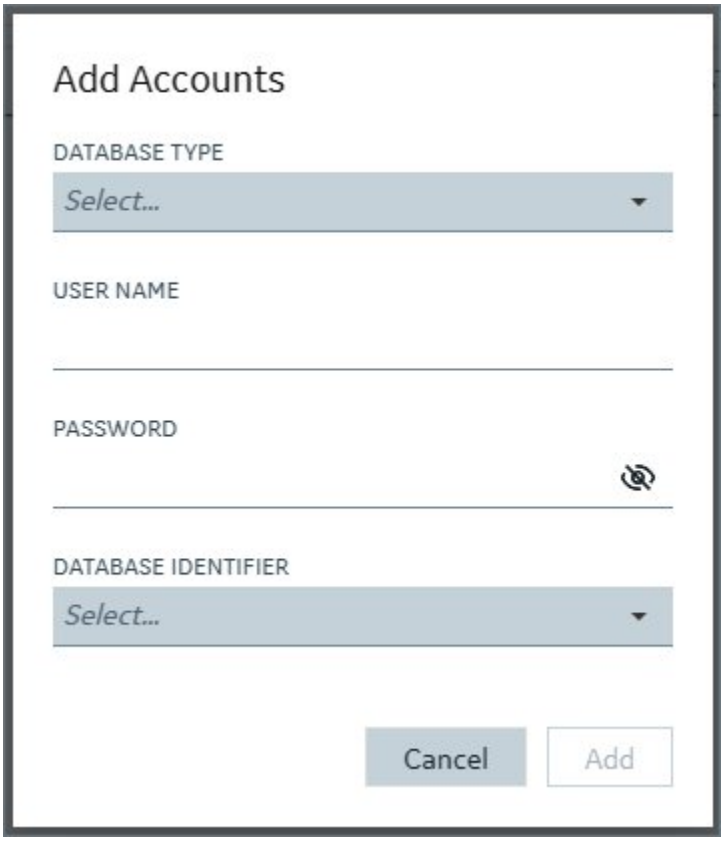


Note:

To refresh the list, click the ellipsis (…) button, and then select **Refresh SQL Accounts**.

3. To add a SQL connection, click the plus (+) icon at the top of the grid.

The Add accounts dialog box appears as shown in the following figure.



4. Enter the information described in the following table.
5. Click **Add**.

Table 6. Add Accounts Dialog Box Fields

Field	Description
Database Type	Allows you to display a list of supported relational databases.
User	Allows you to specify the name of the user's account on the server. This name is usually the same one you use to log onto the server. This field can be left blank or can contain a name with up to 31 characters.
Password	Allows you to specify the password used to log onto the server. This field can be left blank or can contain a password with up to 31 characters.

Table 6. Add Accounts Dialog Box Fields (continued)

Field	Description
	If you enter a user name, then most likely you are required to enter a password. As each character is entered, an asterisk appears in the Password field. This protects your password.
Database Identifier	Allows you to specify the ODBC data source name to which the SQL option can connect. Click the drop-down list to display a list of ODBC data sources.

Model

Model Overview

The iFIX model allows you to create a blueprint or template of the assets in your system and quickly and easily create and maintain instances generated from the Type definition.

The model in iFIX consists of the following components:

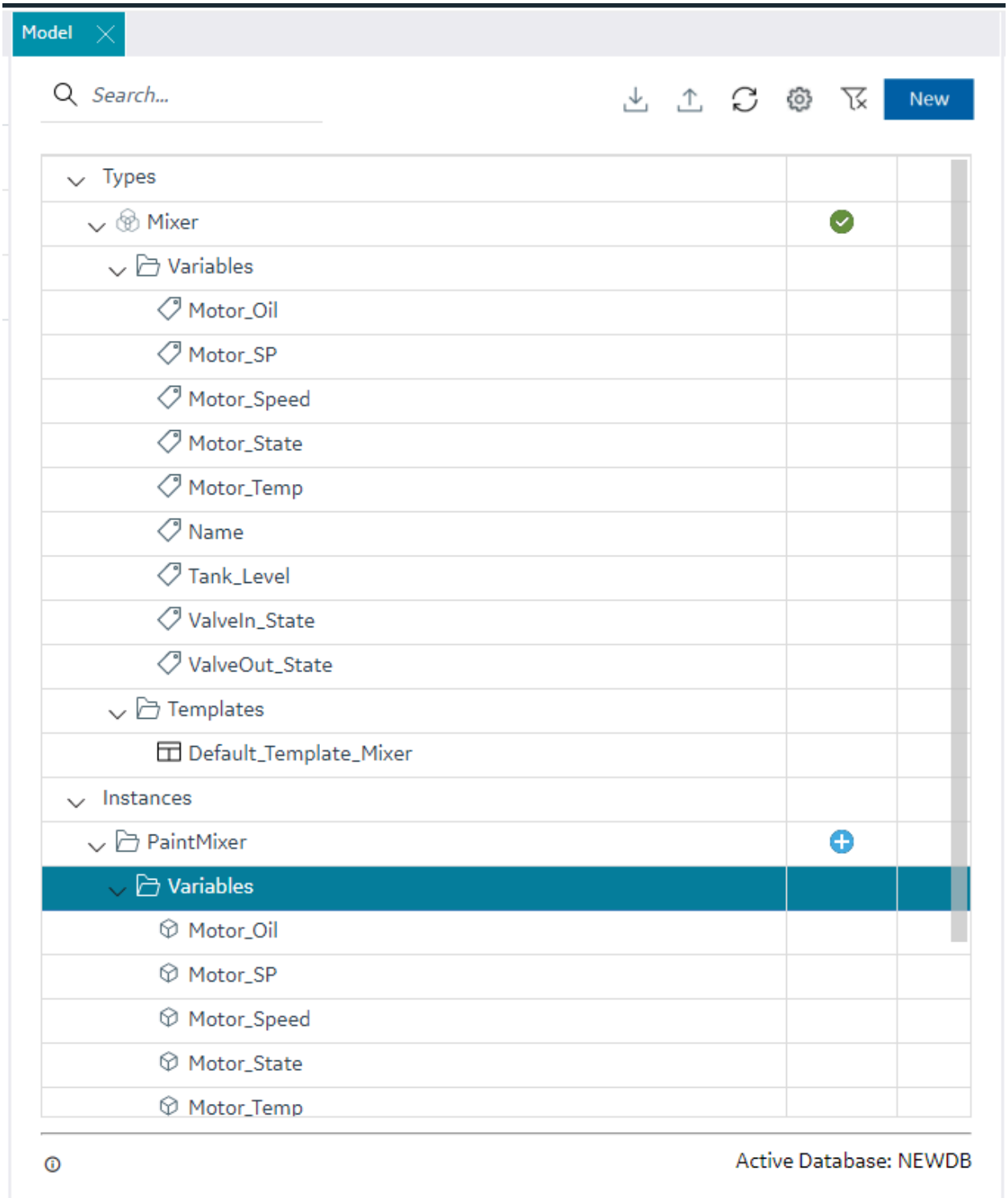
- **Object Types**: An object type is a blueprint. A blueprint is something tangible in your plant that you want to replicate, such as mixer, furnace, or pump, that will have a common structure (common variables and contained types) shared across all mixers, furnaces, and pumps. Object Types will have Variables, Contained Types, and Templates.
- **Variables -** Individual tags or measurements that are common across all Objects of a certain type, like temperature, pressure, flow, and so on. Variables represent tags that will hold values retrieved via iFIX drivers like IGS and OPC UA client from the devices in your system.
- **Templates**: Templates provide the capability to have one or more translations of an Object Type into an Object Instance. If you have two different types of pumps that have some commonly shared variables but a subset that are unique, you would create two templates for a single pump type.

- **Substitutions -** Substitutions allow you to parametrize your Type definition such that you can modify the Object Instances created from the Type and Templates to be unique.
- **Contained Types -** Contained types allow you to create a hierarchical blueprint of assets that will be instantiated together.

- **Object Instances -** An instance created from the Object Type. The instance represents an asset in the application and the variables are either created as iFIX tags (direct variables) or point to existing iFIX tags (indirect variables) or are static to the type (static variables).

Model Panel

The Model panel is where you go to navigate and initiate actions on your model. To configure the model, click on Model entry under your iFIX node in the Navigation panel. You will see a table of Types and Instances in the main panel.



Note:
Be aware that the panel should not be floating, and must be docked before performing any operation.

The Details panel will provide additional information about your selections in the Model panel. The Object types show variables and contained types on expansion and the contained types can be further expanded to navigate through the containment hierarchy. You can also see the hierarchy of templates that will be created for a given parent template. Similarly, the object instances tree provides navigation to the instance containment hierarchy.

The Model panel lets you configure the model in the following ways.

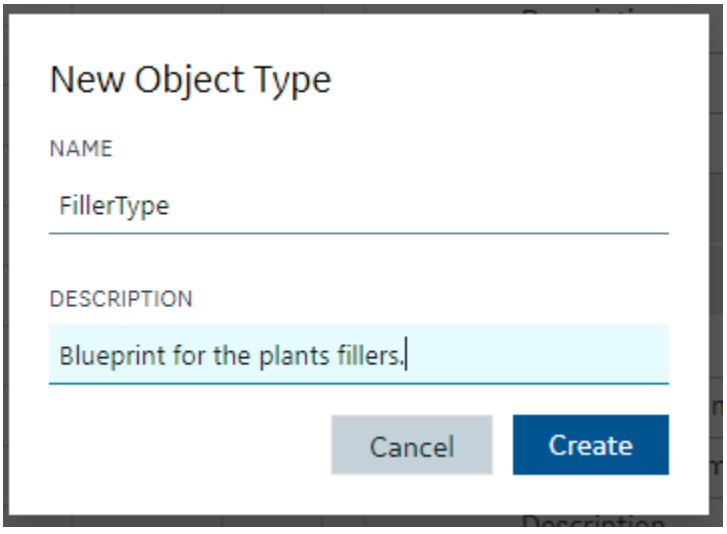
- Create Types
- Edit types (in a separate panel)
- Create Object Instances from Types

> **Warning:**
> In the Model panel, when Object Instances or variables under an Object Instance are selected, the properties are populated on the Details panel. When changes are made to the properties of an instance or variable, these changes are saved on a selection change in the model tree.

Type Creation

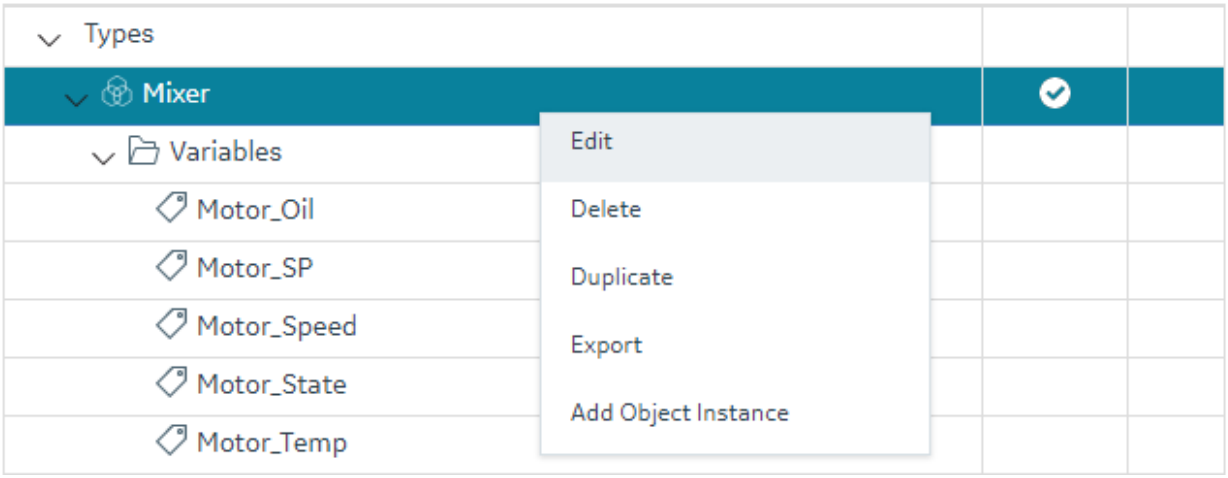
Object Types provide a powerful mechanism for creating and managing Object Instances and variables for your iFIX SCADA. In conjunction with Type Templates, you can generate and update multiple Object Instances from one location.

To create a type, click the "New" button on the top right of the Model panel. This will prompt you for the type name and description.

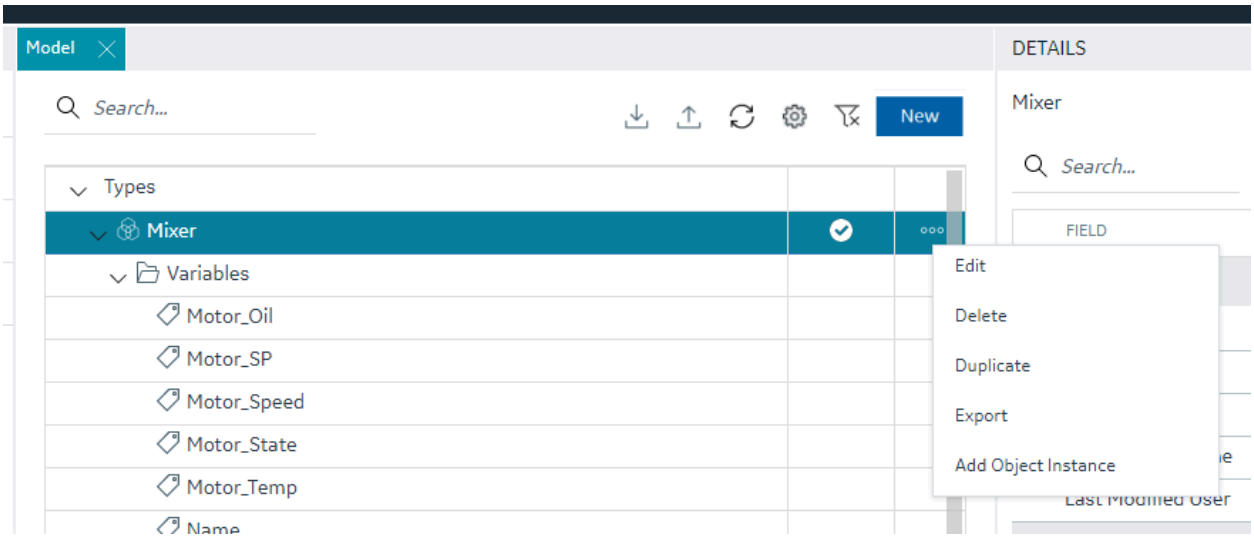


Creating or editing a type will open that type into a separate IDE panel. Currently, there is only one Type Edit panel, so as you edit multiple types, the Type Edit panel will be replaced with the Type currently selected for editing.

After the type is created and saved, the model panel gives you capabilities to manage that type include editing, deleting, duplicating, exporting, or creating an instance of the type.



This can be accessed from the context menu in the Type's row in the grid or the Right-Click menu. Double-clicking the Type's row will open the Type Edit panel.



Note:
When saving a type, any updates will be automatically pushed to existing Object Instances of type. Depending on the number of instances associated with the type, it could take a long time to update. This may result in the save taking a long time.

Type Variables

Type Variables

Type Configuration

When configuring your type, the most important component is the list of variables that define the asset type characteristics or measures.

In the type edit panel, you can add new variables using the New button. You can configure some simple tag details in Type mode including tag type. Switching to template mode allows you to configure the majority of the variable details.

The type of a variable (Number/String/Boolean) can be defined differently between templates. iFIX block types can be mapped differently between templates.

Supported Tag Types for Variable Configuration

The iFIX model supports the following tag types for variable configuration:

- Direct Variables *(on page 316)* - Direct variables when instantiated, become tags in your iFIX database.
- Indirect Variables *(on page 316)* - Indirect variables allow you to reference an existing iFIX tag in the tag database. This can be useful to create a model structure on top of an existing flat tag database.
- Static Variables *(on page 317)* - Static variable store static value for the variables, these variables are not created as iFIX tags, they take the value through an object instance and do not change the value during the runtime.

Details Panel

The Details panel shows the properties of variable type. Setting or changing property values for variables in template mode will translate into any Object Instances that will or are created from this type's templates when you save those changes.

Direct Variables

Direct variables are variables that directly communicate to iFIX drivers. Direct variables are created as iFIX tags in the iFIX database when Object Instances are created. You can configure variable properties in Object Template mode.

Currently, model variables support a subset of the tag types available in the iFIX system. This subset includes:

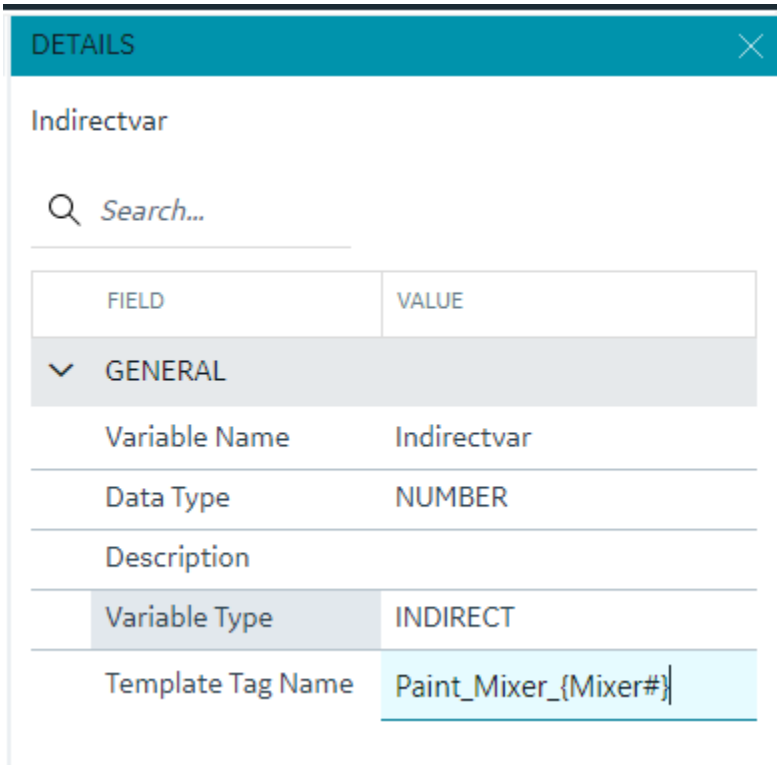
- Numeric types supported - AI, AA, AR, AO, DA, DT, DC, TM
- Boolean types supported - DI, DA, DR, DO, BL
- Text types supported - TX

Indirect Variables

Indirect variables give you the capability to build a model on top of an existing flat tag database. When you create an indirect variable in a Type, for each template, you can use the Details panel to specify a tag or a substitution to generate a tag reference when Object Instances are created.

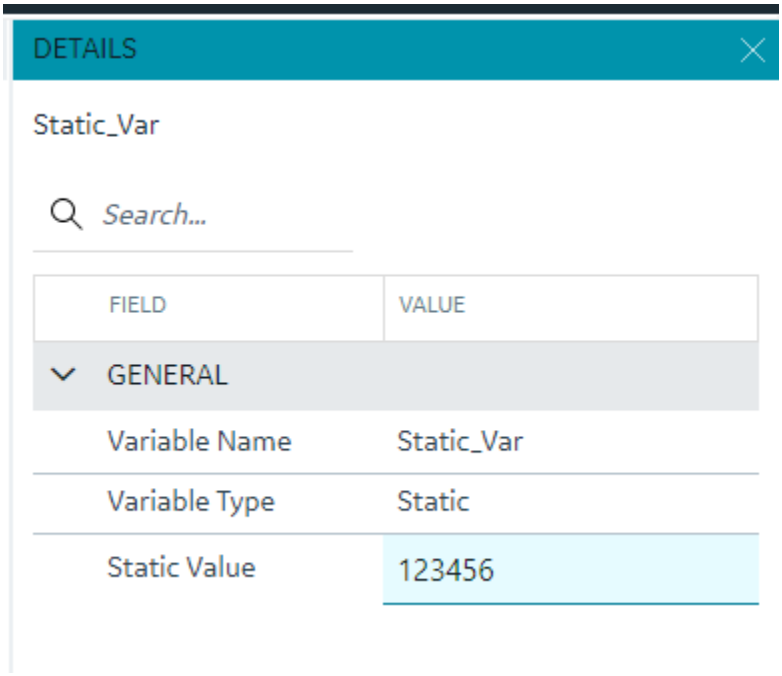
By using a substitution value in the Template Tag Name property, you can dynamically change the name of the variable per Object Instance.

Details panel



Static Variables

Static variables are variables meant to hold static data in your Object Type and Instance. They are read-only variables that are set only at the model instance level and do not create iFIX tags. Static variables can be browsed for and used in your iFIX pictures. An example of a static variable could be a serial number of an Asset.



Template Overview

Templates describe how Object Instances will be created from an Object Type. All Types are created with a default template and require at least one template to work. Creating multiple templates is useful if you have a number of Asset definitions that are similar and have majority of overlapping variables, but have some exceptions.

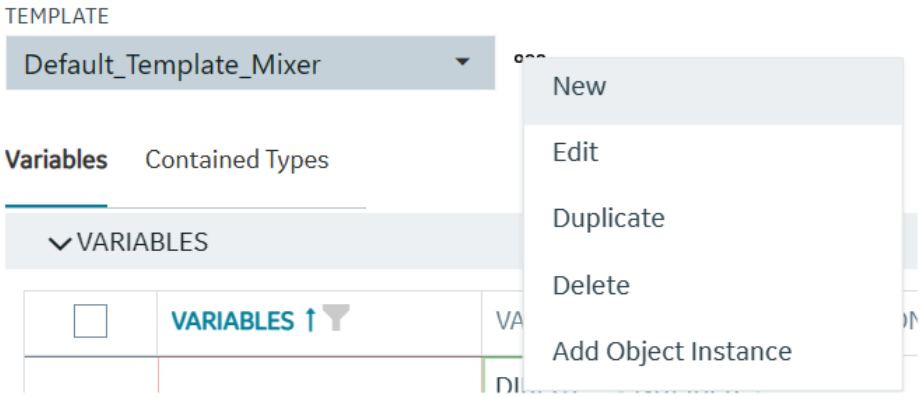
Default Template

A type must always contain at least one Template. By default, when you create a Type, a default template is created for you. If you do not need to account for slight variations in the Object Instances that will be created from your type, then you do not need to configure anything further with the template.

Template Management

Overview

You can manage templates from the Template drop-down in the Type edit panel.

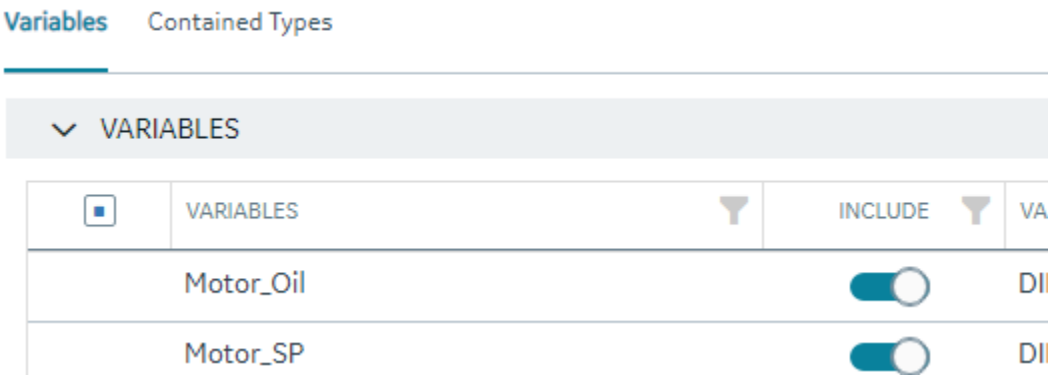


What's Stored in a Template

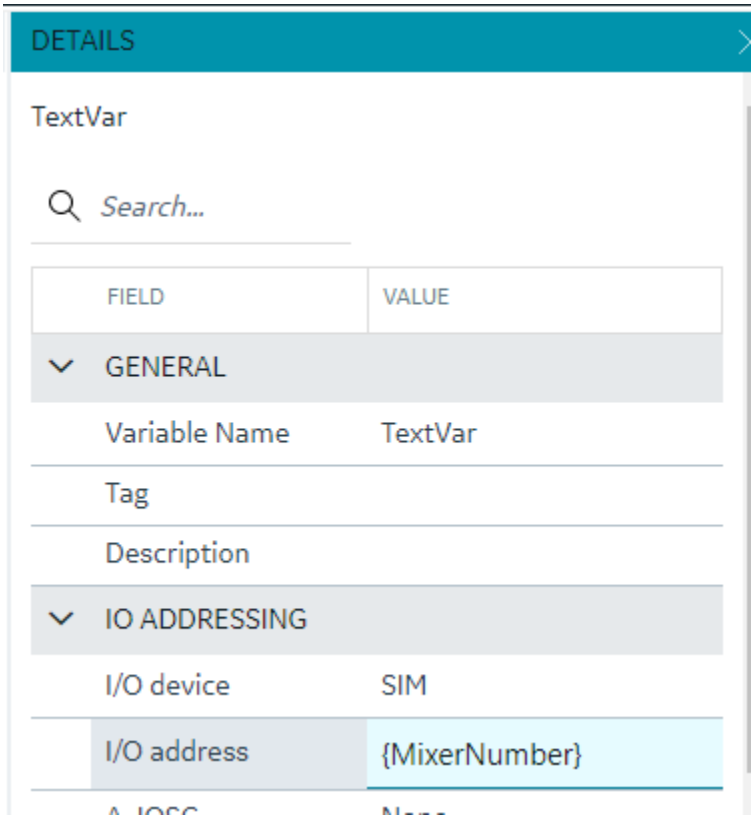
Each template stores a number of details about a type that are unique from other templates in the type. Specifically, the template stores:

- **Substitutions** - are unique per template.
- **Include/Exclude variable** - at the template level, you can choose which variables to include or exclude when an instance is created from that template.
- **Variable property changes** - All property changes you make in template mode, for example the IO address or alarm limits, are stored in the template. They can be different if you create a new template.
- **Contained Type template specification** - for each template, you can specify the template to use when creating an instance from that template for each of your Contained type aliases. Contained types can be included or excluded between templates.

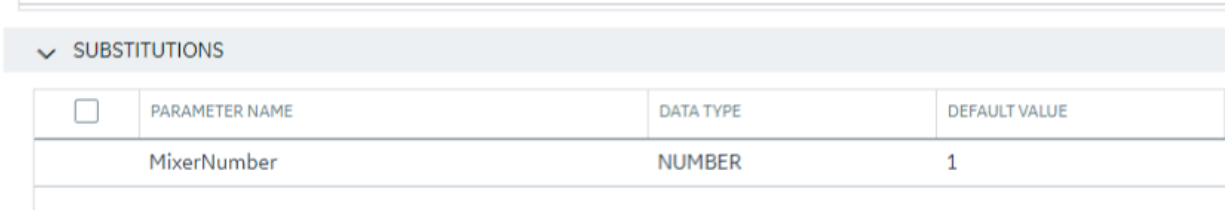
Variables



All property changes you make in template mode, for example the IO address or alarm limits, are stored in the template. They can be different if you create a new template.



Substitutions



Substitutions provide a mechanism to create placeholders in the variable property definitions through the templates. When the variable property value needs to vary between object instances, substitutions can help define a placeholder and provide unique values for each instance. For example, if the I/O address of a variable is defined in the variable template, providing I/O address of a particular tag would bring the same value across all instances. Instead, if we use a substitution in parts of or the full I/O address value, this value can be replaced differently for different instances.

A substitution can be defined and managed as part of a template definition. To use substitutions in template variable properties, use the substitution name surrounded by curly braces within a property. A numeric type property needs to have the full value substituted whereas a string value can have a part substituted or multiple substitutions can be used. Substitutions cannot currently be used for enumerated properties.

For example, a description property for a variable can be defined with substitutions as "This is the serial number \{Asset_Number} of this \{Asset_Name}" where Asset_Number and Asset_Name are substitutions and their values are provided per object instance.

Note:
Formulas are not currently supported within substitution strings used in the Model.

Contained Types

Contained types help define asset containment and provide a hierarchy relationship that can be used to make a multi-level instance as well as utilize this hierarchy during the model consumption in the iFIX picture definitions.

Contained types refer to other existing type definitions and are organized under a parent type. For example, an asset type definition for a pump can contain a shaft type, this can be accomplished by creating a type definition for pump and shaft separately and in the pump type definition, the contained types tab provides options to add a new containment by providing an alias name and selecting the shaft type from the drop-down.

Aliasing

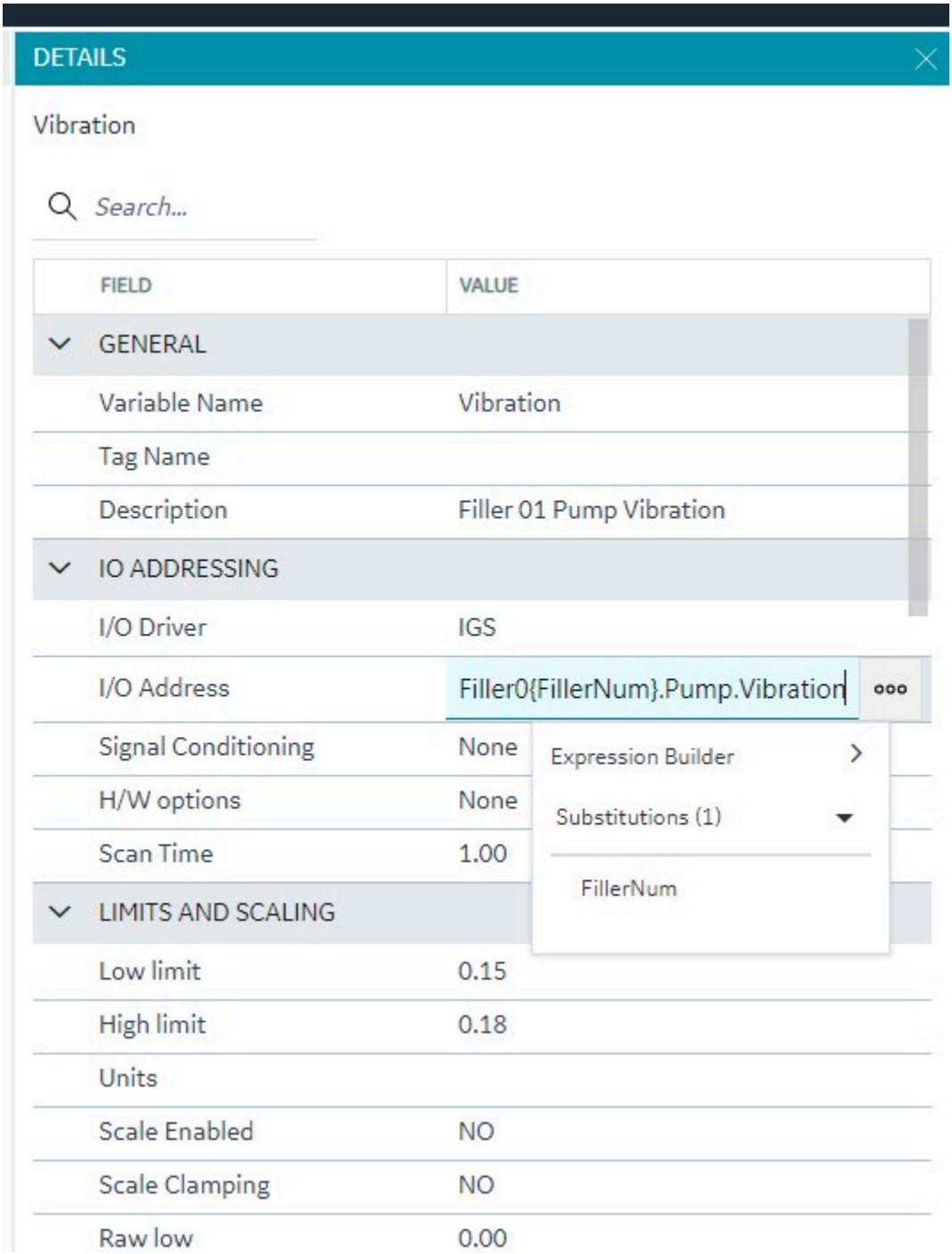
When including contained types under a parent type, you must specify an alias name for that contained type. When the parent type is instantiated, the aliased contained types will be automatically created as instances with the alias name under the Parent instance. Aliasing enables differentiating multiple containments of the same type. You can have more than one alias contained under a parent type and the contained types can also contain other types making up a hierarchy. For example, a pump could contain two bearing units, one for inboard and one for outboard. The bearing type can be added as contained type to the pump with alias names Bearing_Inboard and Bearing_Outboard.

Substitutions

iFIX model type and template variable properties (mapped to tag fields based on block type selected) take input values as numerics, string constants, and substitutions, and offer placeholders for these inputs. You can use substitutions to enable assigning values at instance level for these properties.

You can insert substitutions directly into value cells by browsing. To use this feature, click on the property's cell value. A browse button displays in the value cell. Click this browse button to displays list of substitutions, click on the desired substitution to insert at the cursor position. Substitutions can also be used in expressions along with other value constants to finally evaluate to a final value substitution.

Note:
You refer to parent substitutions using the special character “@” from a contained child object. The value from the parent object instance is substituted to the contained object.



Expression Builder

Expression Builder

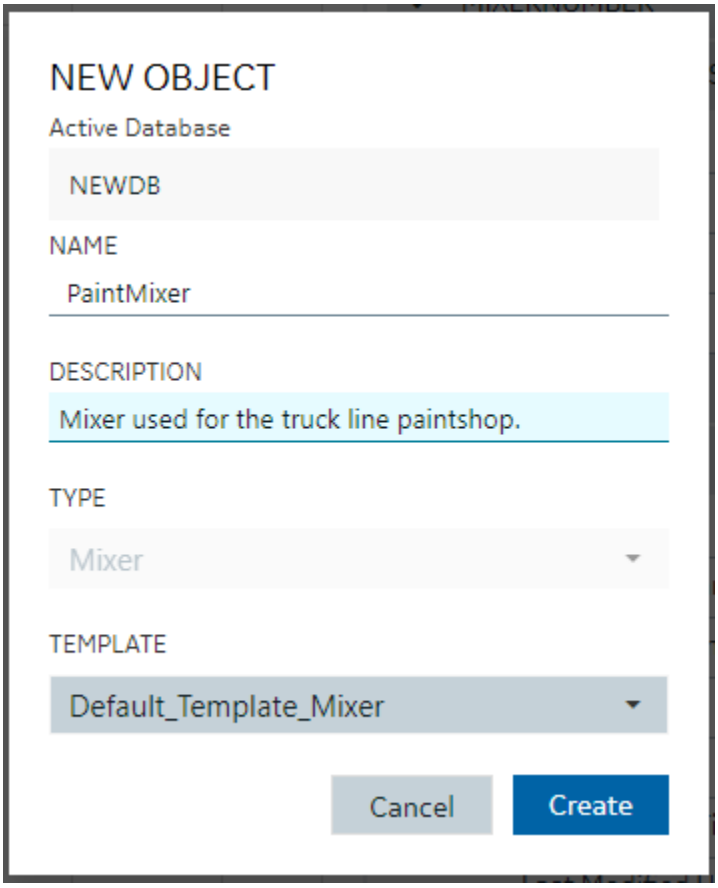
Another placeholder mechanism is enabled for the type variable property values: using an expression to define the value for a property. Expressions can be built using simple mathematical operators and functions. You can also insert substitutions into expressions.

You could also launch expression editor from the property value cell to build the expression.

For example, if you were defining a Pump type and create a variable called RPM, you could create a substitution for High Limit called “RPM_HighLimit” to define alarm limit values for this variable, and you could use an expression like Alarm Hi – “{RPM_HighLimit – 20}”. The substitution value can be set at an instance level and automatically the alarm limits are adjusted based on the High Limit.

Object Creation

When you create a new object, a dialog box appears requesting a name, description, type, and template.



Substitution Values

Any substitution values from the template that an Object Instance was created from can be edited in the Details panel by selecting the Object Instance in the Model Panel.

Model Import and Export

Use the model import and export to help you move the model from one node to another, to make bulk changes to the model itself, or to use your model in Operations Hub.

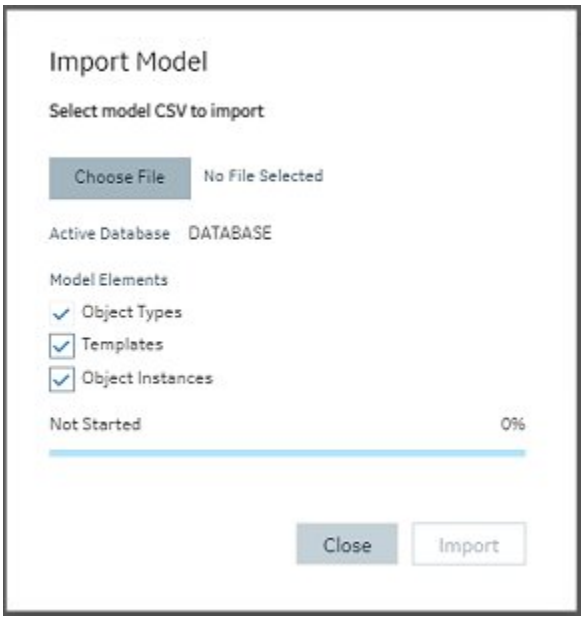
Overview

The Model can be exported or imported for working on outside of Configuration Hub. The Model export is compatible and can be imported into Operations Hub.

To import or export the model, use the first two buttons on the model toolbar:

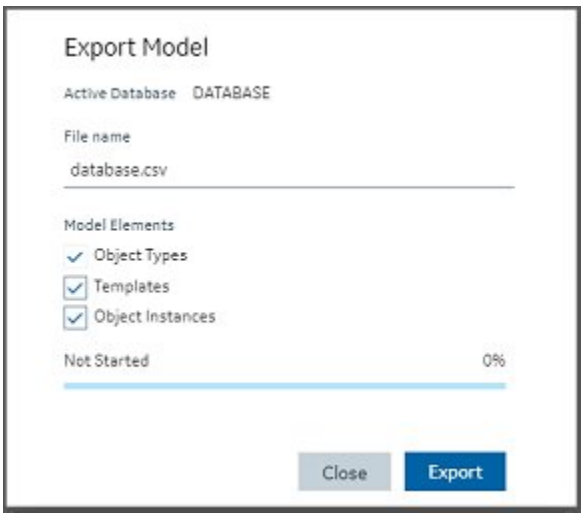
Importing a Model

To import a model, click the import button (). The Import Model dialog box appears where you can choose a file and specify what you want to import.



Exporting a Model

To export a model, click the export button (). The Export Model dialog box appears where you can specify



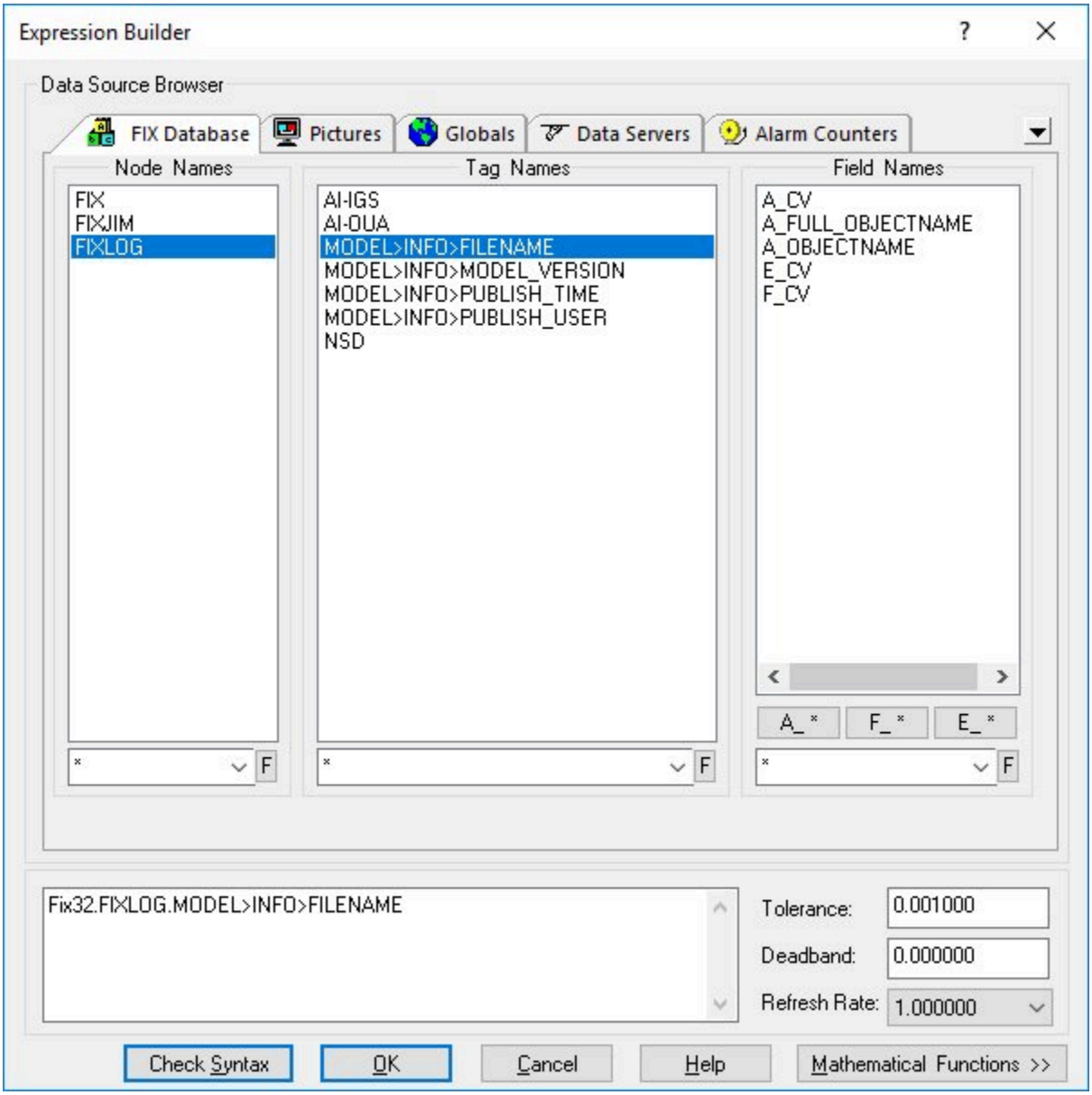
Model Tags in iFIX

Overview

Model-defined tags are also viewable from the iFIX Workspace. These include Indirect and Static variables defined in the model, as well as pre-defined tags that show model-related information. When viewing tags in the iFIX Expression Builder, you can see Indirect and Static variables listed alongside iFIX tags, as well as the pre-defined Model Info tags. Their values can be used in animations in the WorkSpace (such as in data links) just like any other iFIX tag.

Tag	Description
MODEL>INFO>FILENAME	The full file name with path of the model file from which the model was loaded.
MODEL>INFO>MODEL_VERSION	The version of the published model.
MODEL>INFO>PUBLISH_TIME	The time of the last publish.
MODEL>INFO>PUBLISH_USER	The iFIX user who performed the last publish.

Example of Expression Builder with Model Tags Displayed



Notes on the Example

The A_OBJECTNAME and A_FULL_OBJECTNAME fields shown in the previous figure will not have a value for the pre-defined Model Info tags. If iFIX tags are not associated with a variable in the model, they will not display values for these fields.

The Expression Builder does not display the A_OBJECTNAME and A_FULL_OBJECTNAME fields when browsing a tag that exists in the iFIX database – these fields only display when browsing Indirect or Static variables. However, this field can be manually entered for any iFIX database tag, and if that tag

is associated with a variable in the currently published model then the owning object's name will be displayed.

Database

Database Overview

Database Overview

The Database panel provides similar functionality to the iFIX Database Manager, but in a completely different interface: a web one. That interface that should be natively intuitive to those familiar with web-based grid objects. The Database in Configuration Hub has off-line storage where you do your work.

Click on the Database panel to connect to the database running on your iFIX SCADA node. All the tags appear into the off-line database. Interact with your iFIX tags in a web container where you can easily sort, filter, and interact with your iFIX tags.

After you are finished, you can Publish your changes to the running iFIX node. A filterable status column in the database shows the publish status of each tag. A log file is generated every time you Publish providing information about the operation.

Note:
iFIX supports up to 65534 tags per block type depending on the composition of the database in relation to available contiguous shared memory and process memory space.

The currently active iFIX database is what will show in Configuration Hub and is what will receive all operations. This is true regardless of how many users are connected to and configuring the same database. Changes to the database, both published and unpublished, are shared across users and browser sessions.

Note:
Making database updates concurrently using both Configuration Hub and the iFIX Database Manager may result in unexpected behavior.

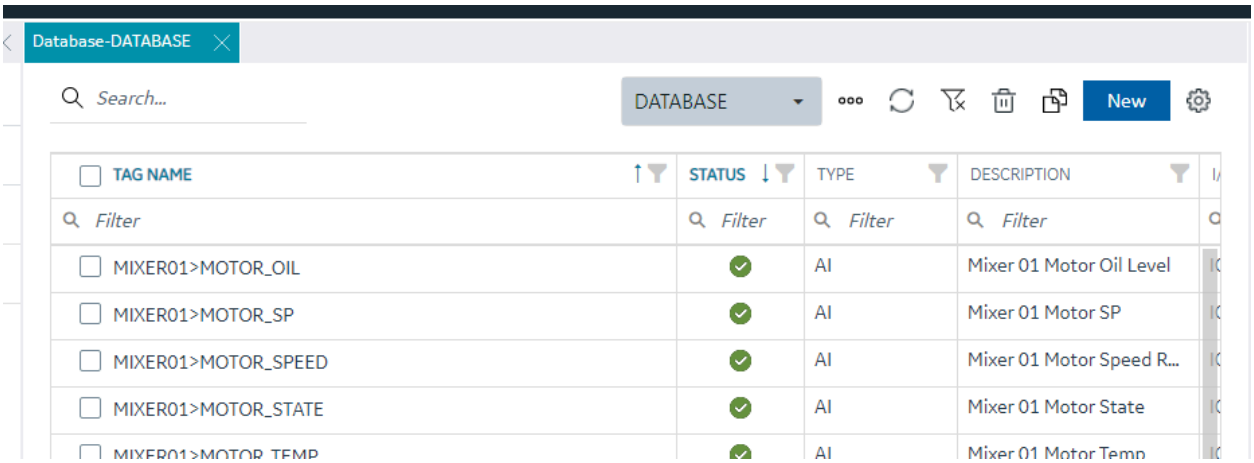
Refer to the following sections for more information about the iFIX Database panel:

- Grid Features *(on page 329)*
- Searching, Filtering, Sorting, and Column Reordering *(on page 329)*

- Database Toolbar *(on page 331)*
- Database Column Choosing *(on page 332)*
- Database Details Panel *(on page 333)*

Grid Features

The database grid provides many great features to allow you to easily and efficiently work with your iFIX data. The grid will always show and configure the currently active iFIX database for the node you are connected to. An example of the grid is displayed in the following figure.



When the active database changes from anywhere, the grid should notify you and ask you to refresh. If at any time you believe it is out of date due to concurrent changes from other locations, the toolbar contains a refresh icon to re-fetch the latest updates. The database grid panel works closely with the Details panel.

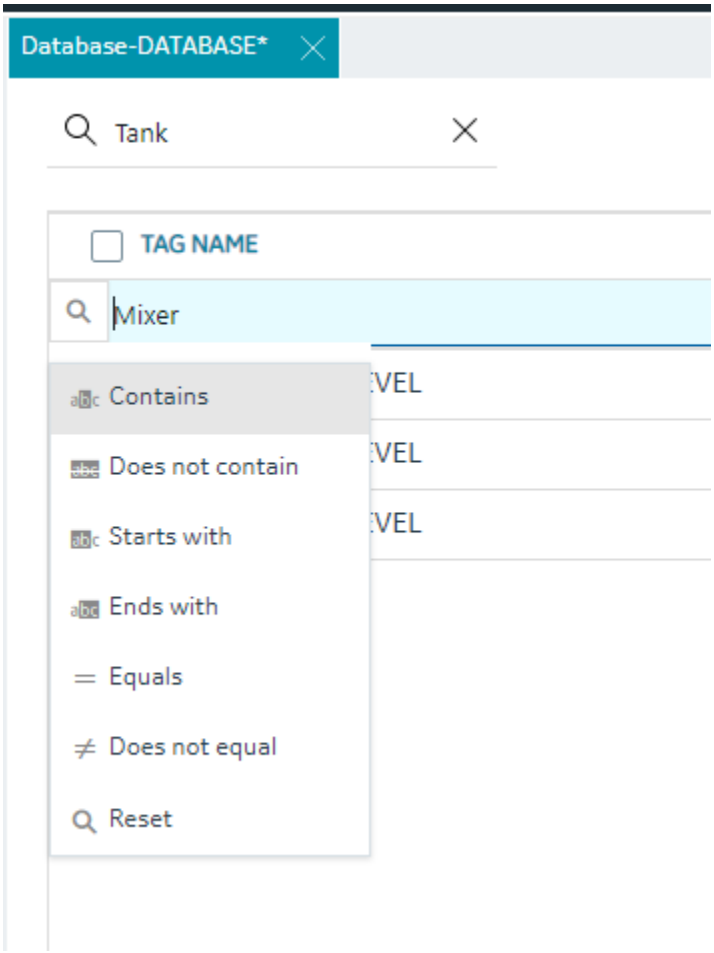
Ensure you have the Details panel open and visible as you work in this panel. As tag rows are selected within the grid, the tag details are displayed and are editable inside the Details panel.

Searching, Filtering, Sorting, and Column Reordering

The following sections provide more details on this functionality.

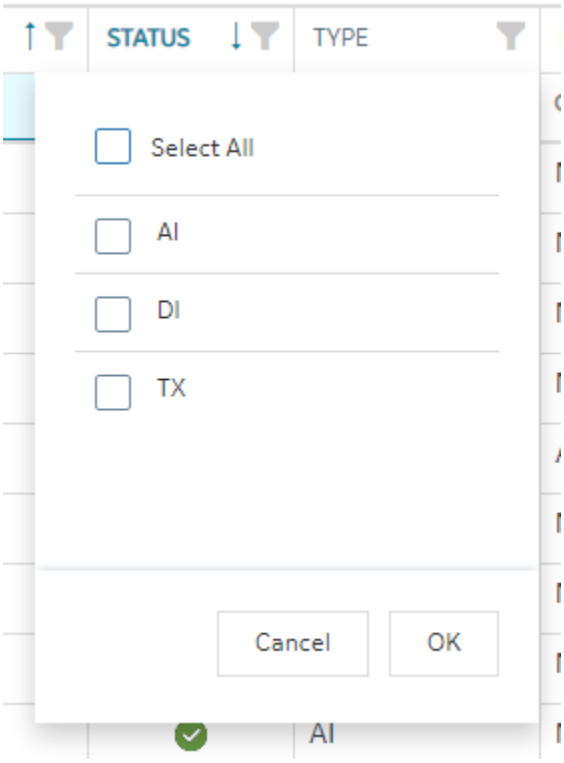
Searching

There are two main search options when using the database grid. A global search that searches the whole grid for the typed in text and a column search that searches a particular column and provides multiple search parameters. Especially for large datasets, using these search options helps to quickly find the tags and data you want to work with.



Filtering

Each column can filter by the current contents of the grid. For example, you can quickly and easily search for all the instances of a particular tag type, status, or IO Driver:



Sorting

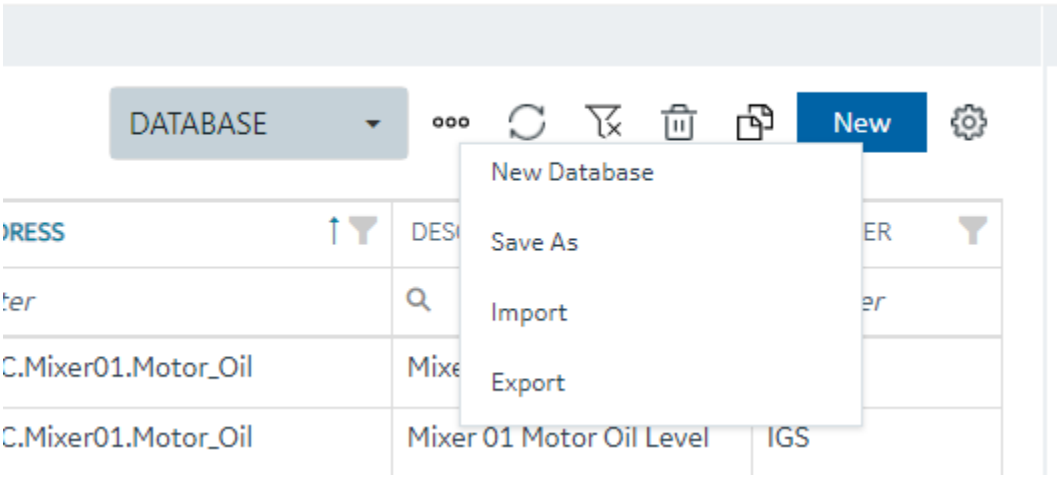
Sorting is easy to do by clicking the header of any column to toggle between ascending and descending sort. For more advanced sorting, you can hold down the shift key and select more than one column to sort by.

Column Re-Ordering and Resizing

The Tag Name is locked at the left position, but the rest of the columns in the database grid can be re-ordered via drag and drop of the column header with your mouse. Any column can be resized to optimally fit the data you are working on.

Database Toolbar

The toolbar for the Database Details screen contains the following icons:



For more information on these icons, refer to the following table.

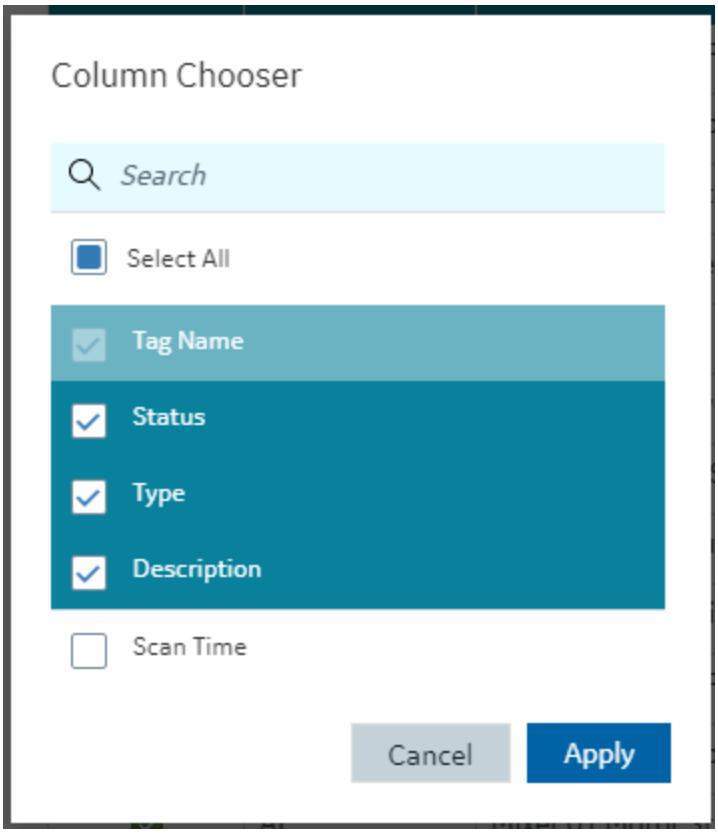
Item	Description
test	Click the drop-down to switch to another database.
ooo	Use this button to open a menu that you can use to create a new database, save a database under another name, import, or export a database.
	Use this to refresh your grid view.
	Click here to clear all filters currently applied to the grid.
	Select one or more tags and click this button to delete a tag(s).
	Select a tag and click this button to duplicate an existing currently selected tag. You will be prompted to enter a new name.
New	Click the New button to add a new tag to the database.
	Use the settings icon to pick the columns you want to display on the Database view.

Database Column Choosing

The Database panel by default shows the following columns:

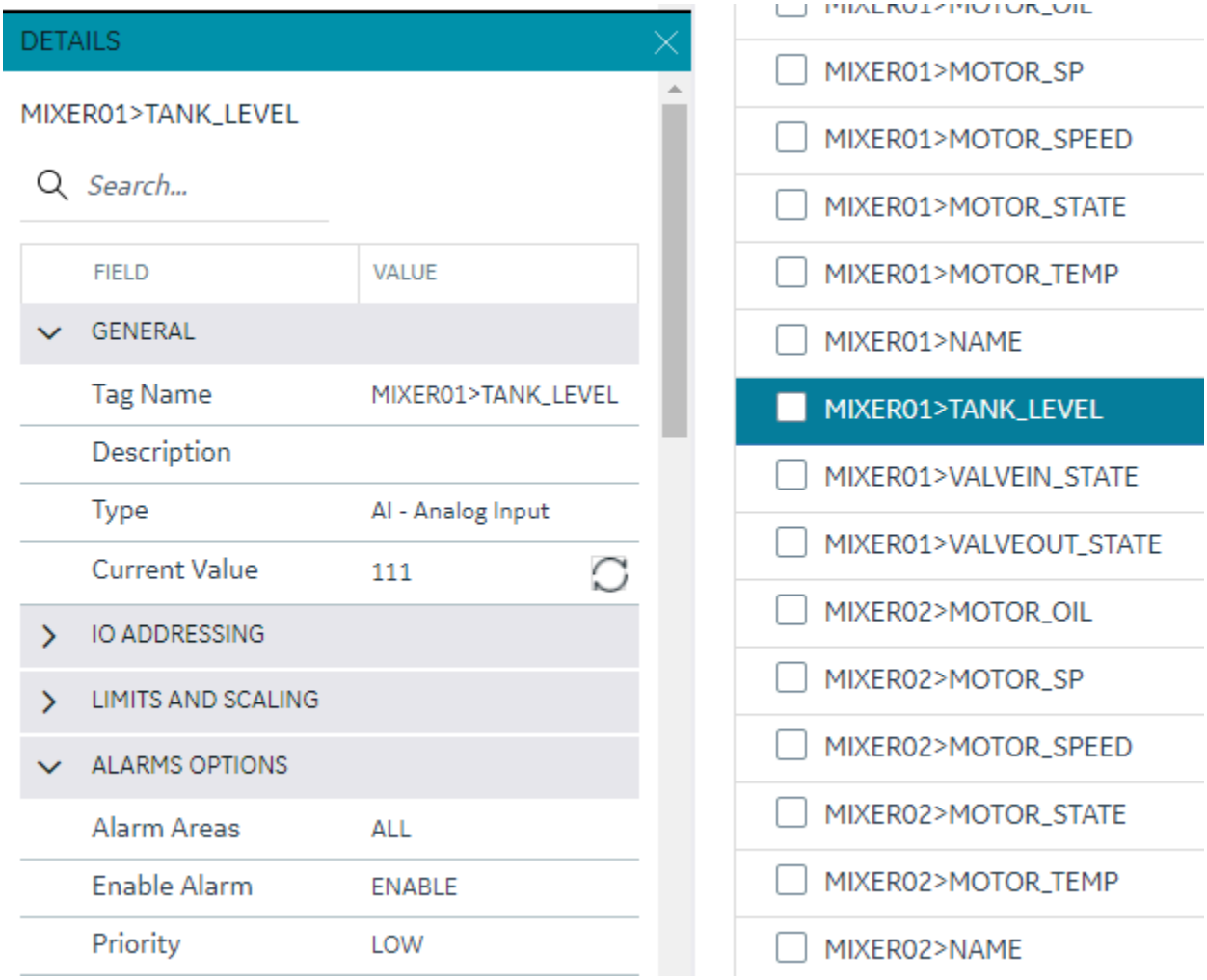
- Tag Name (Fixed and always visible)
- Status - This column shows the publish status of the tag (Published, Unpublished, Modified)
- Type - Displays the block type abbreviation (for example: AI, AA, MDI, and so on)
- Description - Tag description
- I/O Driver - The driver configured for the tag
- I/O Address - The IO address of the tag.

Other columns are available to show in the grid by using the column chooser available when you click on the gear settings icon on the far right of the database toolbar.



Database Details Panel

Editing database tags is done via the Details panel after selecting a particular tag in the Database panel.



The Details panel for the database is made up of property rows with names and values grouped by area. These areas are expandable and collapsible. At the top of the grid is the name of the tag for easy viewing and a search box for filtering and finding the tag property you want to view or configure. The 'Field' and 'View' columns are resizable.

There are different types of properties in the Details panel depending on the type of value being shown or edited. Some are enumerated values with drop down lists, some are text edit boxes and others are numeric edit boxes. Some properties are read only depending on the values of other properties in the grid.

As you make changes on tags, their published status changes to “Modified” and will be applied to the active databases after Publish.

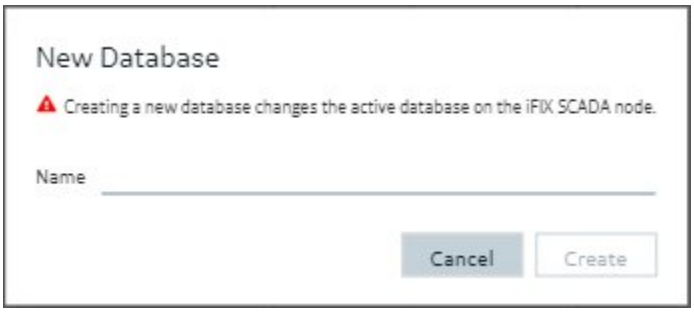
Database Management

Database Management

You can manage your database operations from the Database panel. This includes adding, copying, importing, and exporting your databases.

New Database

When you create a new database, you will be prompted for a new database name (up to 8 characters). After you choose to create a new database, the currently active database switches to this new empty database.

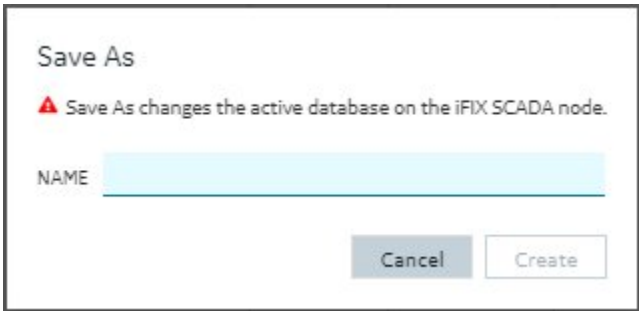


Switching Databases

The drop down in the toolbar lets you quickly switch your currently active iFIX database.

Save as Database

The Save As command lets you take your existing active database and save it as a newly named database. This operation will also switch the active database to the newly copied database.



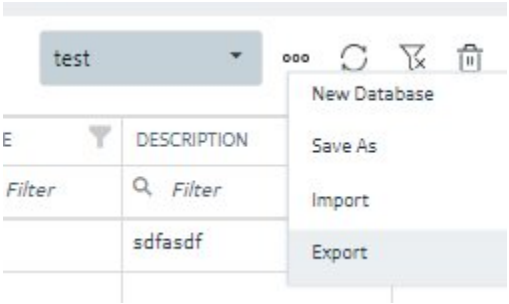
Import or Export a Database

See Import a Database *(on page 337)* or Export a Database *(on page 336)*.

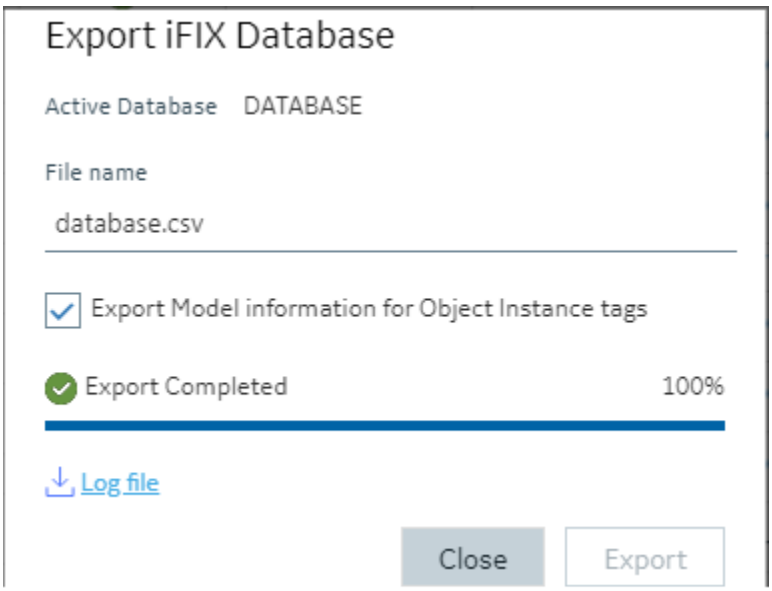
Export a Database

Use the database export when you want to export iFIX tags into a spreadsheet format. These tags can be regular tags (non-model), or both model and non-model tags. Your database is exported in CSV format. You can edit that CSV file in a spreadsheet program and then later import it back into iFIX again.

To export your database, from the Database panel, click the ellipsis (…) icon, and use the drop-down beside the database selector in the toolbar.



When you select the Export option, the Export iFIX Database dialog box appears where you select the options you want and click Export.



The exported file will be automatically downloaded to your browsers in the specified download folder with "export.csv" as the name.

A progress bar keeps you informed of the export progress, especially for larger exports.

After export, you can see the results of the export by clicking on the Log file link to download the log file.

Including/Excluding Model

Exporting your currently active database provides you with an option to export any associated model artifacts that are tied to tags in the database.

Selecting the **Export Model Information for Object Instance Tags** check box (the default) will export the model and associated types and template details. This is most useful when exporting the database to move it to another node or project. Other uses include when you want to back up your model changes, when you want to make bulk changes to the model itself, or to re-import or when you want to use your model in Operations Hub.

Clearing the Export Model Information for Object Instance Tags check box will export just the database tags and their details.

Backwards compatibility

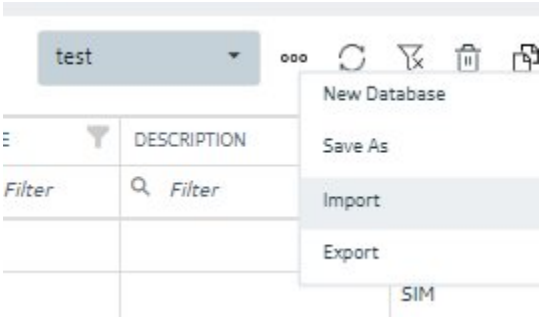
Exports from databases of previous versions of iFIX will import into the new Database Manager. Exporting from the Database panel and importing into older versions of iFIX will also work, however if you choose to export the model associations, these sections will not import and will generate errors.

Import a Database

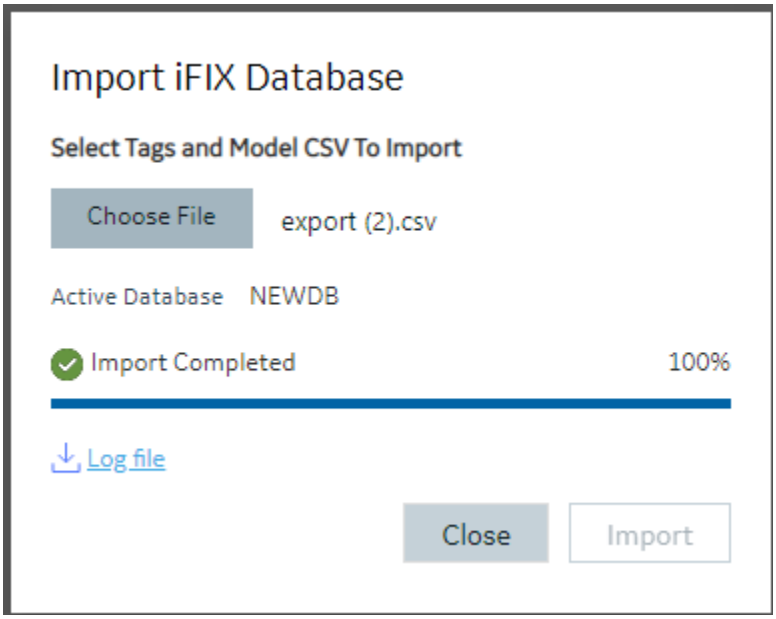
Use the database import when you want to import tags to your iFIX database. These tags can be regular tags (non-model), or both model and non-model tags.

Be aware that Configuration Hub supports only UTF-8 encoded files. The iFIX Database Manager uses ANSI encoding. Prior to importing files into Configuration Hub's Model or Database panel, ensure that the CSV file is in UTF-8 encoding. To do so, open the CSV file in the Windows Notepad editor and perform a SAVE AS with UTF-8 encoding selected, and then save the file as a CSV. Likewise, if you want to import a file from Configuration Hub into the iFIX Database Manager, save as ANSI encoding before importing the file into the Database Manager.

1. Configuration Hub, on the Database panel, click the ellipsis (…) icon to open the shortcut menu.



2. Click Import.



The Import iFIX Database dialog box appears.

3. Click Choose File to select a file to import.
4. Click Import.

Configuring Custom Blocks

For custom blocks to function properly within Configuration Hub, two supporting files are required.

- `block-name.gov`
- `block-name_details.json`

In the above examples, *block-name* is the name of the custom block (e.g., for the D16 block, the files would be named `D16.gov` and `D16_details.json`).

When using the block tool kit to create custom blocks, the utility creates the .gov file; it is up to the user to create the .json file and save it in the `C:\Program Files (x86)\Proficy\iFIX\PDB\` folder.

The basic structure of the .json file is:

- `type_name`: the name of the custom block (e.g., `"type_name": "D16"`)
- *Category* elements outline the logical groupings of items in the details display. Using the D16 block as an example, its categories are `General`, `IO_Addressing`, `Device_States`, `Alarms_Options`, `E-Signature`, and `Advanced_Options`. Within each of these elements, there is a *Rank* entry that specifies the display order. For example:
  - `“rank”: 1` will display at the top of the details pane
  - `"rank": 2` will display next, etc.

Within each of the categories are individual listings of the block fields to be displayed under that heading. For example, the fields listed under the `General` heading of the D16 block are:

```
"General": [
    {
        "A_TAG": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.tagName"
            ]
        }
    },
    {
        "A_DESC": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
```

```
        "rank": 2
    }
```

The behavior of display and input is controlled by these entries. In this example, the tag name (`“A_TAG”`) and description (`“A_DESC”`) are listed in the `General` category. These must correspond to actual field names available in the block. A complete list of field names and their descriptions can be obtained by creating the custom blocks in the iFIX Database Manager and exporting the resulting PDB file to a CSV file, which can be opened (e.g., using Excel) to list the field names and their corresponding descriptions.

Elements are assigned a `“datatype”`, such as `“string”` or `“number”`, and can be given an enumeration set to limit the values entered to those defined in the enumeration set. The possible values will display as a drop-down list for the field. A sample of this is demonstrated in the E-Signature section of the `D16_details.json` file (at the bottom of this page).

```
"enum": [
                                "YES",
                                "NO"
                    ]
```

- Additionally, validation criteria can be provided to stipulate allowable entries for each field. This behavior is controlled by the “validators” section for the tag field. Some commonly used validators are:
    - `TagCommonValidators.maxLength`: Verifies that the value does not exceed the field’s maximum length, which is obtained from the .gov file. For example, `field_length` is used to determine the length (for `tagname` it will be 256).
    - `TagCommonValidators.tagName`: Checks for the tag name characters and matches the validation to that in the iFIX Database Manager. It also checks for duplicates in the current database. For example, the following special characters cannot be in the iFIX tag name - ~ ` + ^ : ? " * = { } . , ; ? @
    - `TagCommonValidators.ioAddress`: This validator applies only to the SIM driver. The value cannot be more than 2000; if a bit value is used, it cannot be more than 15.
    - `TagCommonValidators.isIntegerValidation`: Checks if it is a numeric value, otherwise the input is rejected.
    - `TagCommonValidators.minValue`: Based on the value of `field_min` in the .gov file.
    - `TagCommonValidators.maxValue`: Based on the value of `field_max` in the .gov file.
    - `TagCommonValidators.isEmpty`: Checks if the value is empty.
    - `TagCommonValidators.scanTime`: Matches to the iFIX Database Manager input for scan time.
    - `TagCommonValidators.blockName`: Similar to `tagName`, but does not check for a duplicate tag name in the database.

- `TagCommonValidators.maxPrecision`: Based on the value of `field_precision` in the .gov file.
- `TagCommonValidators.eguValuesNotEqual`: This validator checks if the value is within EGU limits. If the value matches EGU limit values, it is rejected.
- `TagCommonValidators.inValidNumericFormat`: Confirms that the number format matches the locale. Only default number formats for a given locale are supported.

Note:
Depending on the complexity of your custom block, it is recommended to use the `TXT_details.json` (simpler) or `D16_details.json` (more complex) as a template.

TXT_details.json

```
{
    "tag_type": [
        {
            "type_name": "TXT",
            "category": {
                "General": [
                    {
                        "A_TAG": {
                            "default": "",
                            "enum": "",
                            "datatype": "string",
                            "validators": [
                                "TagCommonValidators.maxLength",
                                "TagCommonValidators.tagName"
                            ]
                        }
                    },
                    {
                        "A_DESC": {
                            "default": "",
                            "enum": "",
                            "datatype": "string",
                            "validators": [
                                "TagCommonValidators.maxLength"
                            ]
                        }
```

```
                },
                {
                    "rank": 1
                }
            ],
            "IO_Addressing": [
                {
                    "A_IODV": {
                        "default": "SIM",
                        "enum": [
                            ""
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_IOAD": {
                        "default": "0",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength",
                            "TagCommonValidators.ioAddress"
                        ]
                    }
                },
                {
                    "A_IOSC": {
                        "default": "None",
                        "drivers": [],
                        "enum": [
                            ""
                        ],
                        "datatype": "string"
                    }
                },
                {
```

```
                "A_IOHT": {
                    "default": "None",
                    "enum": [
                        "None"
                    ],
                    "datatype": "string"
                }
            },
            {
                "rank": 2
            }
        ],
        "Limits_and_Scaling": [
            {
                "A_ELO": {
                    "default": "0.00",
                    "field_min": "-3.4E+38",
                    "field_max": "3.4E+38",
                    "field_precision": "16",
                    "enum": "",
                    "datatype": "number",
                    "validators": [
                        "TagCommonValidators.minValue",
                        "TagCommonValidators.maxValue",
                        "TagCommonValidators.maxPrecision",
                        "TagCommonValidators.isEmpty",
                        "TagCommonValidators.eguValuesNotEqual"
                    ]
                }
            },
            {
                "A_EHI": {
                    "default": "100.00",
                    "field_min": "-3.4E+38",
                    "field_max": "3.4E+38",
                    "field_precision": "16",
                    "enum": "",
```

```
                        "datatype": "number",
                        "validators": [
                            "TagCommonValidators.minValue",
                            "TagCommonValidators.maxValue",
                            "TagCommonValidators.maxPrecision",
                            "TagCommonValidators.isEmpty",
                            "TagCommonValidators.eguValuesNotEqual"
                        ]
                    }
                },
                {
                    "A_EGUDESC": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "rank": 3
                }
            ],
            "Text Strings": [
                {
                    "TR0": {
                        "default": "1",
                        "field_min": "1",
                        "field_max": "65535",
                        "enum": "",
                        "datatype": "number",
                        "validators": [
                            "TagCommonValidators.maxLength",
                            "TagCommonValidators.isIntegerValidation",
                            "TagCommonValidators.minValue",
                            "TagCommonValidators.maxValue"
```

```
            ]
        }
    },
    {
        "A_TS0": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "TR1": {
            "default": "2",
            "field_min": "1",
            "field_max": "65535",
            "enum": "",
            "datatype": "number",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS1": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
```

```
                },
                {
                    "TR2": {
                        "default": "4",
                        "field_min": "1",
                        "field_max": "65535",
                        "enum": "",
                        "datatype": "number",
                        "validators": [
                            "TagCommonValidators.maxLength",
                            "TagCommonValidators.isIntegerValidation",
                            "TagCommonValidators.minValue",
                            "TagCommonValidators.maxValue"
                        ]
                    }
                },
                {
                    "A_TS2": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "TR3": {
                        "default": "8",
                        "field_min": "1",
                        "field_max": "65535",
                        "enum": "",
                        "datatype": "number",
                        "validators": [
                            "TagCommonValidators.maxLength",
                            "TagCommonValidators.isIntegerValidation",
                            "TagCommonValidators.minValue",
```

```
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS3": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "TR4": {
            "default": "16",
            "field_min": "1",
            "field_max": "65535",
            "enum": "",
            "datatype": "number",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS4": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
```

```
                    }
                },
                {
                    "TR5": {
                        "default": "32",
                        "field_min": "1",
                        "field_max": "65535",
                        "enum": "",
                        "datatype": "number",
                        "validators": [
                            "TagCommonValidators.maxLength",
                            "TagCommonValidators.isIntegerValidation",
                            "TagCommonValidators.minValue",
                            "TagCommonValidators.maxValue"
                        ]
                    }
                },
                {
                    "A_TS5": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "TR6": {
                        "default": "64",
                        "field_min": "1",
                        "field_max": "65535",
                        "enum": "",
                        "datatype": "number",
                        "validators": [
                            "TagCommonValidators.maxLength",
                            "TagCommonValidators.isIntegerValidation",
```

```
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS6": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "TR7": {
            "default": "128",
            "field_min": "1",
            "field_max": "65535",
            "enum": "",
            "datatype": "number",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS7": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
```

```
                ]
            }
        },
        {
            "TR8": {
                "default": "256",
                "field_min": "1",
                "field_max": "65535",
                "enum": "",
                "datatype": "number",
                "validators": [
                    "TagCommonValidators.maxLength",
                    "TagCommonValidators.isIntegerValidation",
                    "TagCommonValidators.minValue",
                    "TagCommonValidators.maxValue"
                ]
            }
        },
        {
            "A_TS8": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "TR9": {
                "default": "512",
                "field_min": "1",
                "field_max": "65535",
                "enum": "",
                "datatype": "number",
                "validators": [
                    "TagCommonValidators.maxLength",
```

```
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS9": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "TR10": {
            "default": "1024",
            "field_min": "1",
            "field_max": "65535",
            "enum": "",
            "datatype": "number",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS10": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
```

```
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "TR11": {
            "default": "2048",
            "field_min": "1",
            "field_max": "65535",
            "enum": "",
            "datatype": "number",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS11": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "TR12": {
            "default": "4096",
            "field_min": "1",
            "field_max": "65535",
            "enum": "",
            "datatype": "number",
            "validators": [
```

```
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS12": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "TR13": {
            "default": "8192",
            "field_min": "1",
            "field_max": "65535",
            "enum": "",
            "datatype": "number",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
                "TagCommonValidators.maxValue"
            ]
        }
    },
    {
        "A_TS13": {
            "default": "",
            "enum": "",
            "datatype": "string",
```

```
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "TR14": {
                "default": "16384",
                "field_min": "1",
                "field_max": "65535",
                "enum": "",
                "datatype": "number",
                "validators": [
                    "TagCommonValidators.maxLength",
                    "TagCommonValidators.isIntegerValidation",
                    "TagCommonValidators.minValue",
                    "TagCommonValidators.maxValue"
                ]
            }
        },
        {
            "A_TS14": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "TR15": {
                "default": "32768",
                "field_min": "1",
                "field_max": "65535",
                "enum": "",
                "datatype": "number",
```

```
                    "validators": [
                        "TagCommonValidators.maxLength",
                        "TagCommonValidators.isIntegerValidation",
                        "TagCommonValidators.minValue",
                        "TagCommonValidators.maxValue"
                    ]
                }
            },
            {
                "A_TS15": {
                    "default": "",
                    "enum": "",
                    "datatype": "string",
                    "validators": [
                        "TagCommonValidators.maxLength"
                    ]
                }
            },
            {
                "A_TS16": {
                    "default": "",
                    "enum": "",
                    "datatype": "string",
                    "validators": [
                        "TagCommonValidators.maxLength"
                    ]
                }
            },
            {
                "rank": 4
            }
        ],
        "E-Signature": [
            {
                "A_ESIGTYPE": {
                    "default": "NONE",
                    "enum": [
```

```
                            "NONE",
                            "PERFONLY",
                            "PERFVERI"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_ESIGCONT": {
                        "default": "YES",
                        "enum": [
                            "YES",
                            "NO"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_ESIGACK": {
                        "default": "NO",
                        "enum": [
                            "YES",
                            "NO"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_ESIGREQ_COMMENT": {
                        "default": "NO",
                        "enum": [
                            "YES",
                            "NO"
                        ],
                        "datatype": "string"
                    }
                },
```

```
                {
                    "A_ESIGTRAP": {
                        "default": "REJECT",
                        "enum": [
                            "REJECT",
                            "ACCEPT",
                            "LOG"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "rank": 5
                }
            ],
            "Advanced_Options": [
                {
                    "A_OUT": {
                        "default": "NO",
                        "enum": [
                            "YES",
                            "NO"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_CASE": {
                        "default": "NO",
                        "enum": [
                            "YES",
                            "NO"
                        ],
                        "datatype": "string"
                    }
                },
                {
```

```
                    "Security_Areas": {
                        "default": "NONE",
                        "enum": [
                            ""
                        ],
                        "datatype": "string",
                        "applies_to": [
                            "A_SA1",
                            "A_SA2",
                            "A_SA3"
                        ]
                    }
                },
                {
                    "A_SA1": {
                        "default": "NONE",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_SA2": {
                        "default": "NONE",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_SA3": {
                        "default": "NONE",
                        "enum": "",
```

```
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_ALMEXT1": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_ALMEXT2": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "rank": 6
                }
            ]
        }
    }
]
}
```

D16_details.json


```
{
    "tag_type": [
        {
            "type_name": "D16",
            "category": {
                "General": [
                    {
                        "A_TAG": {
                            "default": "",
                            "enum": "",
                            "datatype": "string",
                            "validators": [
                                "TagCommonValidators.maxLength",
                                "TagCommonValidators.tagName"
                            ]
                        }
                    },
                    {
                        "A_DESC": {
                            "default": "",
                            "enum": "",
                            "datatype": "string",
                            "validators": [
                                "TagCommonValidators.maxLength"
                            ]
                        }
                    },
                    {
                        "rank": 1
                    }
                ],
                "IO_Addressing": [
                    {
                        "A_MODE": {
                            "default": "A",
                            "enum": [
```

```
                "A",
                "D"
            ],
            "datatype": "string"
        }
    },
    {
        "A_IODV": {
            "default": "SIM",
            "enum": [
                ""
            ],
            "datatype": "string"
        }
    },
    {
        "A_IOAD": {
            "default": "0",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.ioAddress"
            ]
        }
    },
    {
        "A_COUNT": {
            "default": "16",
            "enum": "",
            "datatype": "string",
            "field_min": "1",
            "field_max": "16",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.isIntegerValidation",
                "TagCommonValidators.minValue",
```

```
                        "TagCommonValidators.maxValue",
                        "TagCommonValidators.isEmpty"
                    ]
                }
            },
            {
                "A_IOHT": {
                    "default": "None",
                    "enum": [
                        "None"
                    ],
                    "datatype": "string"
                }
            },
            {
                "A_SCANT": {
                    "default": "1",
                    "enum": "",
                    "ProcessByException": "",
                    "PhaseAt": "",
                    "datatype": "number",
                    "validators": [
                        "TagCommonValidators.maxLength",
                        "TagCommonValidators.scanTime"
                    ]
                }
            },
            {
                "rank": 2
            }
        ],
        "Device_States": [
            {
                "A_LABEL[00]": {
                    "default": "",
                    "enum": "",
                    "datatype": "string",
```

```
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AE[00]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_INVERT[00]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_LABEL[01]": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AE[01]": {
```

```
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_INVERT[01]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_LABEL[02]": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AE[02]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
```

```
    },
    {
        "A_INVERT[02]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_LABEL[03]": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AE[03]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_INVERT[03]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
```

```
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_LABEL[04]": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AE[04]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_INVERT[04]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_LABEL[05]": {
                        "default": "",
```

```
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AE[05]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_INVERT[05]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_LABEL[06]": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
```

```
                {
                    "A_AE[06]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_INVERT[06]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_LABEL[07]": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AE[07]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
```

```
            "datatype": "string"
        }
    },
    {
        "A_INVERT[07]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_LABEL[08]": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AE[08]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_INVERT[08]": {
            "default": "N",
            "enum": [
```

```
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_LABEL[09]": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AE[09]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_INVERT[09]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
```

```
            "A_LABEL[10]": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "A_AE[10]": {
                "default": "N",
                "enum": [
                    "Y",
                    "N"
                ],
                "datatype": "string"
            }
        },
        {
            "A_INVERT[10]": {
                "default": "N",
                "enum": [
                    "Y",
                    "N"
                ],
                "datatype": "string"
            }
        },
        {
            "A_LABEL[11]": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
```

```
                    }
                },
                {
                    "A_AE[11]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_INVERT[11]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_LABEL[12]": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AE[12]": {
                        "default": "N",
                        "enum": [
                            "Y",
```

```
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_INVERT[12]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_LABEL[13]": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AE[13]": {
            "default": "N",
            "enum": [
                "Y",
                "N"
            ],
            "datatype": "string"
        }
    },
    {
        "A_INVERT[13]": {
```

```
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_LABEL[14]": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AE[14]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_INVERT[14]": {
                        "default": "N",
                        "enum": [
                            "Y",
                            "N"
                        ],
                        "datatype": "string"
                    }
```

```
        },
        {
            "A_LABEL[15]": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "A_AE[15]": {
                "default": "N",
                "enum": [
                    "Y",
                    "N"
                ],
                "datatype": "string"
            }
        },
        {
            "A_INVERT[15]": {
                "default": "N",
                "enum": [
                    "Y",
                    "N"
                ],
                "datatype": "string"
            }
        },
        {
            "rank": 3
        }
    ],
    "Alarms_Options": [
        {
```

```
                    "Alarm_Areas": {
                        "default": "ALL",
                        "enum": [
                            ""
                        ],
                        "datatype": "string",
                        "applies_to": [
                            "A_AREA1",
                            "A_AREA2",
                            "A_AREA3",
                            "A_AREA4",
                            "A_AREA5",
                            "A_AREA6",
                            "A_AREA7",
                            "A_AREA8",
                            "A_AREA9",
                            "A_AREA10",
                            "A_AREA11",
                            "A_AREA12",
                            "A_AREA13",
                            "A_AREA14",
                            "A_AREA15"
                        ]
                    }
                },
                {
                    "A_IENAB": {
                        "default": "ENABLE",
                        "enum": [
                            "DISABLE",
                            "ENABLE"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_PRI": {
```

```
                "default": "LOW",
                "enum": [
                    "INFO",
                    "LOW",
                    "LOLO",
                    "MEDIUM",
                    "HIGH",
                    "HIHI",
                    "CRITICAL"
                ],
                "datatype": "string"
            }
        },
        {
            "A_AREA1": {
                "default": "ALL",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "A_AREA2": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "A_AREA3": {
                "default": "",
                "enum": "",
```

```
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AREA4": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AREA5": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AREA6": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
```

```
            "A_AREA7": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "A_AREA8": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "A_AREA9": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
            }
        },
        {
            "A_AREA10": {
                "default": "",
                "enum": "",
                "datatype": "string",
                "validators": [
                    "TagCommonValidators.maxLength"
                ]
```

```
                    }
                },
                {
                    "A_AREA11": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AREA12": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AREA13": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "A_AREA14": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
```

```
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_AREA15": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_IALMSHLVENAB": {
            "default": "DISABLE",
            "enum": [
                "ENABLE",
                "DISABLE"
            ],
            "datatype": "string"
        }
    },
    {
        "A_ALMSHELVEPOLICY": {
            "default": "",
            "enum": [
                ""
            ],
            "datatype": "string"
        }
    },
    {
        "rank": 4
    }
```

```
            ],
            "E-Signature": [
                {
                    "A_ESIGTYPE": {
                        "default": "NONE",
                        "enum": [
                            "NONE",
                            "PERFONLY",
                            "PERFVERI"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_ESIGCONT": {
                        "default": "YES",
                        "enum": [
                            "YES",
                            "NO"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_ESIGACK": {
                        "default": "NO",
                        "enum": [
                            "YES",
                            "NO"
                        ],
                        "datatype": "string"
                    }
                },
                {
                    "A_ESIGREQ_COMMENT": {
                        "default": "NO",
                        "enum": [
```

```
                        "YES",
                        "NO"
                    ],
                    "datatype": "string"
                }
            },
            {
                "A_ESIGTRAP": {
                    "default": "REJECT",
                    "enum": [
                        "REJECT",
                        "ACCEPT",
                        "LOG"
                    ],
                    "datatype": "string"
                }
            },
            {
                "rank": 5
            }
        ],
        "Advanced_Options": [
            {
                "A_ISCAN": {
                    "default": "ON",
                    "enum": [
                        "ON",
                        "OFF"
                    ],
                    "datatype": "string"
                }
            },
            {
                "A_REALM": {
                    "default": "YES",
                    "enum": [
                        "YES",
```

```
                        "NO"
                    ],
                    "datatype": "string"
                }
            },
            {
                "Security_Areas": {
                    "default": "NONE",
                    "enum": [
                        ""
                    ],
                    "datatype": "string",
                    "applies_to": [
                        "A_SA1",
                        "A_SA2",
                        "A_SA3"
                    ]
                }
            },
            {
                "A_SA1": {
                    "default": "NONE",
                    "enum": "",
                    "datatype": "string",
                    "validators": [
                        "TagCommonValidators.maxLength"
                    ]
                }
            },
            {
                "A_SA2": {
                    "default": "NONE",
                    "enum": "",
                    "datatype": "string",
                    "validators": [
                        "TagCommonValidators.maxLength"
                    ]
```

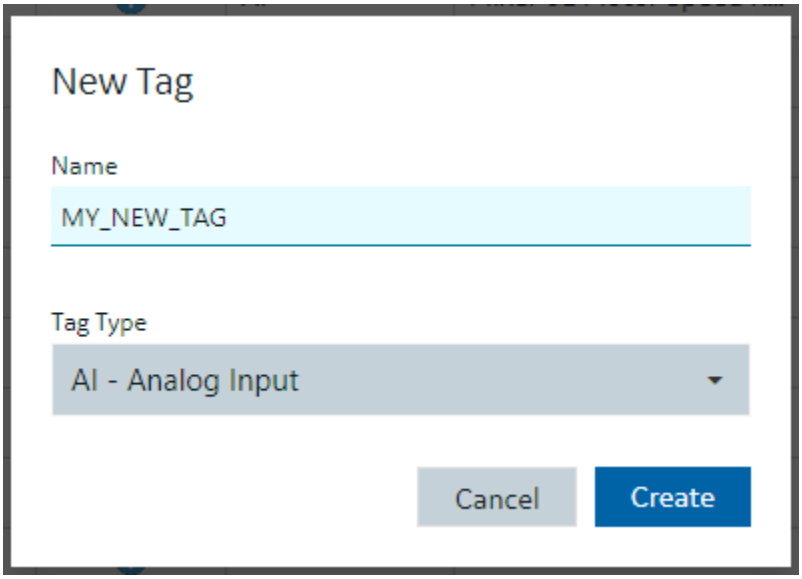
```
        }
    },
    {
        "A_SA3": {
            "default": "NONE",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
        }
    },
    {
        "A_PREV": {
            "default": "",
            "enum": "",
            "validators": []
        }
    },
    {
        "A_NEXT": {
            "default": "",
            "enum": "",
            "validators": [
                "TagCommonValidators.maxLength",
                "TagCommonValidators.blockName"
            ]
        }
    },
    {
        "A_ALMEXT1": {
            "default": "",
            "enum": "",
            "datatype": "string",
            "validators": [
                "TagCommonValidators.maxLength"
            ]
```

```
                    }
                },
                {
                    "A_ALMEXT2": {
                        "default": "",
                        "enum": "",
                        "datatype": "string",
                        "validators": [
                            "TagCommonValidators.maxLength"
                        ]
                    }
                },
                {
                    "rank": 6
                }
            ]
        }
    }
]
}
```

Tag Management

Adding Tags

If you want to add a tag, from the toolbar in Configuration Hub, click the New button. This action will allow you to create a new tag in the iFIX database. When creating a new tag, you are required to choose your Tag Type. The dialog box will show errors if you use characters that are not allowed or if the tag length (256) is too long.



Editing Tags

To edit a tag, select it in the Database grid and you will see the Details panel property grid. Find the property you want to change (for example, the I/O address) by either scrolling to the property or searching for it. Making a change to a property will cause the Database panel to go into an unsaved state. When you have made the changes that you want to the tag or to multiple tags, be sure to save your changes, by clicking the Save button. Exiting the panel with unsaved changes will prompt you to save however closing your browser without saving your changes using the Save button will lose your changes.

Deleting or Bulk Deleting Tags

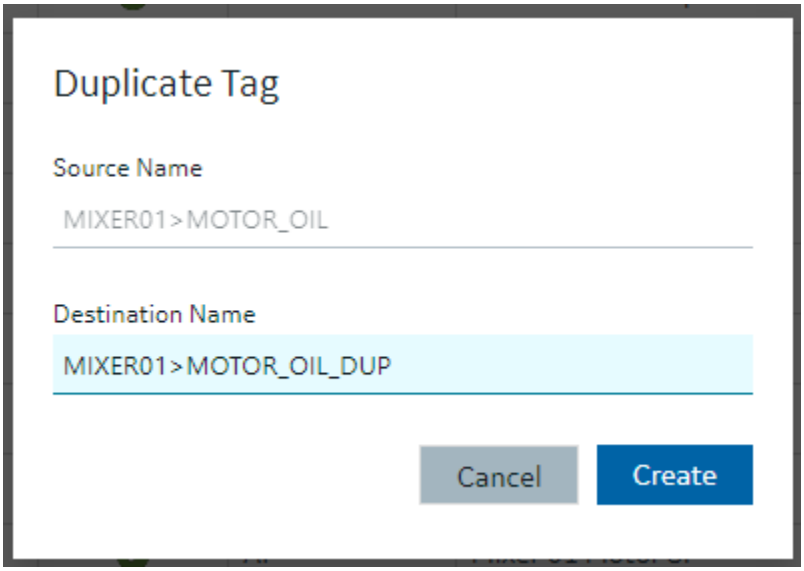
Deleting tags from the Database panel can be accomplished in a few different ways:

- Selecting a row and pressing the delete key.
- Pressing the delete icon in the toolbar.
- Right-clicking a row and selecting Delete will remove the tag from the list and put the panel in an unsaved state.
- Multi-selecting more than one tag using the check boxes in the first column allows you to do bulk deletes.

If you don't want to save your deletions, close the panel, and choose not to save.

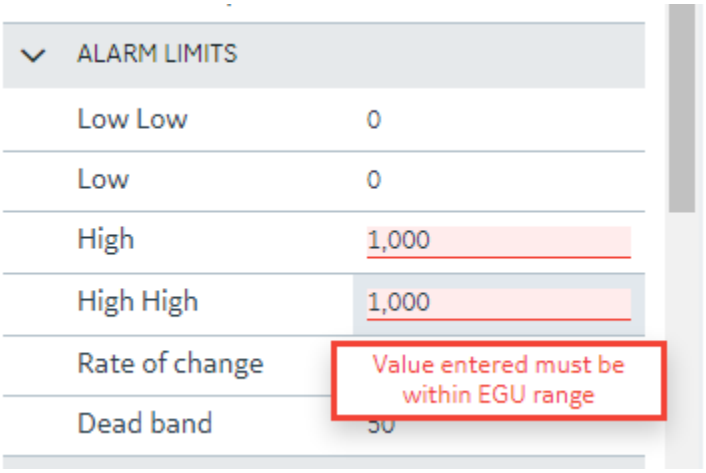
Duplicating Tags

The Database panel allows you to select a tag and duplicate it using the toolbar or Right Clicking on a row. Only one tag at a time can be duplicated. You will be prompted to enter a new name for the duplicated tag:

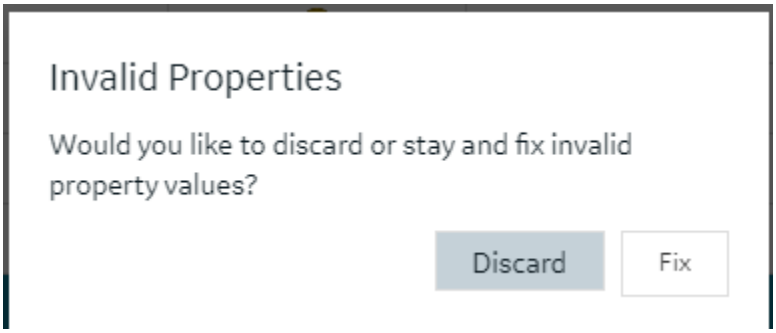


Validations

Certain properties of different tag types require input to be of a certain type of format. The Details panel will highlight when you have incorrectly input a value that is not acceptable for a given property. Some properties may become invalid based on other properties. This is indicated by a red shaded and underlined cell color, and a tooltip appears when you hover over the invalid property.



Generally, you cannot leave a property in an invalid state when leaving the Details panel to select another tag. You will be prompted to revert or stay and fix the invalid property states. An example message is shown in the following graphic.

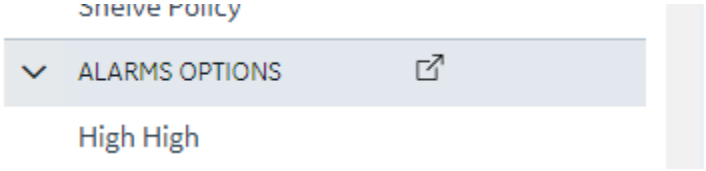


Custom Editors

Some property areas on certain tag types are difficult to understand and edit when flattened into a Field/Value pair properties in the Details panel. In these cases, the Database Details panel will often provide a customized editor, so you have more room to edit the fields. For example:

- The Alarm Options in the AA block.
- The Input Definitions in the PA block.
- The Data Definitions in the SQD block.
- The Programming Statements in the PG block.

Customized editors are indicated in the group/area headers and provide a launch button to open. The following example shows the launch button in the Alarms Options heading.



Here is an example of the dialog box that opens Alarm Options for the AA tag:

It is the same content available from the details pane, but just in a larger viewing area. Changes made in the custom dialog boxes are reflected back into the Details panel properties when closed.

Tag Properties

Tag Properties

The following table describes all the tag types (block types) available in the Configuration Hub application.

Note:
iFIX has block types in its database, such as AA (Analog Alarm), AI (Analog Input), and so on. For the purposes of this help document, when we use the term “tag”, we are referring to any block type.

Tag Type	Description
AA Tag *(on page 397)*	The Analog Alarm (AA) tag sends and receives analog data from the I/O driver, OPC server, or OPC UA server to provide alarm control. Using this tag you can suspend alarms and define limits and priorities for each alarm. The tag can also wait a specified time interval before issuing an alarm,

Tag Type	Description
	close a contact when an alarm occurs, and automatically reissue and acknowledge alarms.
AI Tag *(on page 422)*	The Analog Input (AI) tag sends and receives analog data from an I/O driver, OPC server, or OPC UA server every time the Scan, Alarm, and Control (SAC) program scans the tag.
AO Tag *(on page 455)*	The Analog Output (AO) tag sends an analog signal to an I/O driver, OPC server, or OPC UA server every time it receives a value from an upstream tag, an operator, a Program block, a script, or from its Initial Value field.
AR Tag *(on page 471)*	The Analog Register (AR) tag reads and writes analog values to process hardware. It provides both input and output capacity in a single tag using a minimum amount of memory because iFIX only processes the tag when a picture that references it is open.
BB Tag *(on page 493)*	The On-Off Control (BB) tag opens and closes up to two digital outputs based upon an incoming analog value or an operator input.
BL Tag *(on page 506)*	The Boolean (BL) tag calculates a single true/false output from multiple inputs.
CA Tag *(on page 524)*	The Calculation (CA) tag performs simple mathematical calculations on the value passed by the upstream tag and up to seven other constants or tag values. **Note:** The precision of calculations is fifteen digits. Round-off errors can occur in the sixteenth digit.
DA Tag *(on page 558)*	The Digital Alarm (DA) tag sends and receives digital data (1 or 0) from an I/O driver, OPC server, or

Tag Type	Description
	OPC UA server to provide alarm control. Using this tag, you can suspend alarms and define an alarm condition and an alarm priority. The tag can also wait a specified time interval before issuing an alarm, close a contact when an alarm occurs, and automatically reissue and acknowledge alarms.
DC Tag *(on page 574)*	The Device Control (DC) tag coordinates the opening and closing of digital devices on the plant floor based upon certain user-defined conditions. This tag allows for the timed operation of a device by confirming its status with feedback signals.
DI Tag *(on page 588)*	The Digital Input (DI) tag sends and receives digital data (1 or 0) from an from the I/O driver, OPC server, or OPC UA server every time the Scan, Alarm, and Control (SAC) program scans the tag.
DO Tag *(on page 601)*	The Digital Output (DO) tag sends a digital value (1 or 0) to an from the I/O driver, OPC server, or OPC UA server every time it receives a value from an upstream tag, an operator, a Program block, a script, or from its Initial Value field. Because iFIX processes Digital Output tags whenever a new value is sent to the hardware, they generally operate as though they were latched. If you configure a Digital Output tag as a stand alone tag, it outputs a digital value each time the value changes.
DR Tag *(on page 611)*	The Digital Register (DR) tag reads and writes digital values to process hardware. It provides both input and output capacity in a single tag using a minimum amount of memory because iFIX only processes the tag when a picture that references it is open.

Tag Type	Description
DT Tag *(on page 628)*	The Dead Time (DT) tag can delay the transfer of an input value to the next tag in the chain.
ETR Tag *(on page 637)*	The Extended Trend (ETR) tag collects up to 600 values from an upstream tag. By using this tag, you can trend up to 10 minutes worth of data (assuming a one second scan time) with one tag instead of chaining multiple Trend tags together. In addition, you can store several hours, or even days of real-time data, by combining different scan rates in conjunction with the Average Compress field. The upstream primary tag in the chain determines Extended Trend tag's scan time. When the tag receives a value, it stores the data and passes it to the next downstream tag immediately. You can display data collected by the tag using a chart in the iFIX WorkSpace. **Note:** The process database also provides a Trend tag. This tag trends up to 80 values. If you need to trend more than 80 values, use the Extended Trend tag.
EV Tag *(on page 648)*	The Event Action (EV) tag tests the value or alarm condition of the previous tag using IF-THEN-ELSE logic. Based upon the outcome of the test expression, the tag can then either open or close a digital point or turn a tag on or off scan.
FN Tag *(on page 658)*	The Fanout (FN) tag sends the value it receives to the next tag and up to four additional tags. The tag listed as a next tag receives the value immediately. The additional destination tags receive the value the next time iFIX scans those tags. If the destina-

Tag Type	Description
	tion tag is in Manual mode, the update is instantaneous.
HS Tag *(on page 677)*	The Histogram (HS) tag records how frequently a value occurs during a specified period.
LL Tag *(on page 695)*	The Lead Lag (LL) tag allows you to simulate process dynamics by combining the advantages of lead and lag compensation strategies. **Tip:** We suggest you use this tag only if you are thoroughly familiar with lead lag theory. If you simply need a time delay, consider using the Dead Time tag. The Lead Lag formula is: Output=C3[C1(Input-Prior Output)+(Input*Scan time)+C2(Prior Output)] where: C1 = Lead Time C2 = Lag Time $C3 = \frac{K}{C2 + \text{Scan Time}}$ C1, C2, and the scan time (of the primary tag) are in seconds. K is the constant defined in the tag's Constant field.
MDI Tag *(on page 705)*	The Multistate Digital Input (MDI) tag provides a means of monitoring the state of one, two, or three related digital inputs. The tag produces a raw input value (0 - 7) based on digital values it receives from an from the I/O driver, OPC server, or OPC UA server every time the Scan, Alarm, and Control (SAC) program scans the tag.

Tag Type	Description
PA Tag *(on page 733)*	The Pareto (PA) tag can accept up to eight inputs and calculate percentages for them.
PG Tag *(on page 748)*	The Program (PG) tag provides a powerful means of running short programs to increase the degree of automation in your process or to assist in batch control. For a list of the supported commands that you can use in programming statements see the iFIX Database Reference.
PID Tag *(on page 766)*	The PID tag maintains balance in a closed loop by changing the controlled variable (an analog output) in response to deviations from a user-defined set point. The difference between the actual value (an analog input) and the set point value is the error, or deviation. In response to errors, the PID tag calculates an appropriate control output signal, which attempts to reduce the error to zero. The adjustment that the PID tag makes is a function of the difference between the set point and the measurement, in addition to the values of the proportional band, the reset, and the rate.
RB Tag *(on page 783)*	The Ratio Bias (RB) tag lets you change an incoming signal by adding a constant (bias) and/or by multiplying by a constant (ratio). The tag calculates the constant by subtracting an offset from the signal. The following equation illustrates this method: Output = Ratio (Input - Offset) + Bias **Note:** This is a variation of y = mx + b.

Tag Type	Description
RM Tag *(on page 793)*	The Ramp (RM) tag decreases or increases a target output value. The tag provides up to three stages for ramping values. Each ramp stage lets you specify a target value and a ramp rate. The first two stages also provide a hold time. At each scan cycle, the Ramp tag sends its output value to the tag specified in the Next Block field .
SC Tag *(on page 808)*	The Statistical Control (SC) tag lets you adjust a value from another tag by calculating the average offset and the rate of deviation from the average XBARBAR.
SD Tag *(on page 818)*	The Statistical Data (SD) tag collects and performs statistical calculations on data.
SQD Tag *(on page 834)*	The SQL Data (SQD) tag identifies the data to read or write when a SQL Trigger tag executes. The SQL Data tag transfers data between the iFIX process database and your relational database.
SQT Tag *(on page 843)*	The SQL Trigger (SQT) tag lets iFIX execute SQL commands.
SS Tag *(on page 859)*	The Signal Select (SS) tag provides a means of sampling up to six inputs, manipulating the inputs according to a user-selected mode, and sending the result to the next tag.
TM Tag *(on page 876)*	The Timer (TM) tag functions as a time counter by incrementing or decrementing its value.
TR Tag *(on page 887)*	The Trend (TR) tag can collect up to 80 values over a period of time. You can trend these values by connecting the tag to a chart in the iFIX WorkSpace. The upstream primary tag in the chain determines Trend tag's scan time. When the tag receives a value, it stores the data and passes it with negligible

Tag Type	Description
	dead time (transportation delay) to the next down-stream tag immediately.
TT Tag *(on page 897)*	The Totalizer (TT) tag maintains a floating-point total for values passed to it from upstream tags.
TX Tag *(on page 906)*	The Text (TX) tag reads and writes text from your process hardware or an OPC server. When the tag receives text, it sends the data to all enabled alarm destinations assigned to the tag's alarm areas.

AA Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([),

Field	Description
	close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.

Field	Description
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you se-

Field	Description
	lect a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example**

Field	Description
	0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38.

Field	Description
	• Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38.

Field	Description
	• Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is

Field	Description
	used strictly as a display label to identify the engineering units.
Scale Enabled	Lets you enable or disable scaling for this tag. Enabling scaling allows the system to convert the data received from input sensors to designated data ranges. **Note:** Linear scaling and signal conditioning cannot be applied simultaneously. If you select Linear Scaling, verify that Signal Conditioning is set to NONE. **Example** Scaling allows conversion of temperature data received in Fahrenheit to an output which uses Celsius values.
Scale Clamping	Lets you enable or disable clamping for this tag. When you enable clamping, any value the tag receives is limited to the raw range. Any value the tag sends is limited to the scaled range. **Note:** Do not enable clamping unless it is necessary. Because clamping limits the data received and sent, some data may be missed by the tag.
Raw Low	Lets you specify the low limit for the values received by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received.

Field	Description
	Valid Entries • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Raw High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Use Low/High Limits	Enables the tag to use the range specified in the Engineering Units fields as the output values. Typically, EGU values normally reflect the expected operating ranges, or the Scale Low and Scale High values for the tag. However, the EGU values also dictate behavior in other areas such as alarming. By allowing the Scale Low and Scale High values to be set to values other than the EGU values, you can

Field	Description
	further manage conditions when alarms would be generated. **Note:** If you are Using this tag for charts, make sure to select Use EGU. Selecting this option will make it easier for you to see the changes within the expected range in your chart, because the chart axes will correspond to your expected range and not the entire range of the sensors. The smaller range of the chart makes changes in values more obvious.
Scale Low	Lets you specify the low limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** Changes made to this field are not reflected in the data until after the next tag scan.

Field	Description
Scale High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** Changes made to this field are not reflected in the data until after the next tag scan.

Alarm Settings

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag.

Field	Description
	When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Remote Ack Tag	Lets you specify a tag and field name pair to use for alarm acknowledgment. When the value of the tag and field name pair changes from zero to a value greater than zero, the block acknowledges the alarm. **Valid Entries** Any floating point tag and field name (F_CV) pair in the tag.field format. You cannot use an A_CV field as a Remote Acknowledge entry. When the Analog Alarm tag is exception-based, acknowledging an alarm from the iFIX WorkSpace immediately triggers processing of the tag. Acknowledging the alarm with the Remote Acknowledge field does not trigger the Scan, Alarm and Control (SAC) program to process the Analog Alarm tag.
Alarm Suspension Tag	Provides intelligent alarming by defining a tag and field name pair to control alarm processing. When the value of the tag and field name pair is zero, the Analog Alarm block processes alarms. When the value is other than zero, either a positive or nega-

Field	Description
	tive number, the tag suspends alarms and generates a suspend alarm message. **Valid Entries** Any floating point tag and field name (F_CV) pair in the block.field format. **Note:** If you specify the same tag and field name pair for multiple Analog Alarm blocks, you can suspend alarms within one or more alarm areas. This is an optional feature.
Target Value	Lets you specify the optimum value for the tag. A deviation alarm occurs when the current value of the tag varies from the target value by an amount greater than the deviation alarm's value. **Valid Entries** Any floating point tag and field name (F_CV) pair in the tag.field format or a numeric value within the Low and High Limits (EGU). By default, the field is blank. **Note:** Target Value is an optional field and is used only with deviation alarms.
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Alarm Options

Field	Description
High High	Lets you enter the threshold for the alarm type. If the block's value exceeds this threshold, the block generates an alarm.
HIHI alarm priority	Lets you enter INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL to define the priority of the alarm type.
HIHI cc-tag	Lets you enter the name of a digital tag that closes when an alarm occurs.
HIHI cc-mode	Lets you enter Acknowledge, Return, All Clear, or Never to define when to open the digital contact.
HIHI delay time	Lets you enter the amount of time the tag waits before generating an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
HIHI re-alarm time	Lets you enter the amount of time the tag waits before re-issuing an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
High	Lets you enter the threshold for the alarm type. If the block's value exceeds this threshold, the block generates an alarm.
HI alarm priority	Lets you enter INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL to define the priority of the alarm type.

Field	Description
HI cc-tag	Lets you enter the name of a digital tag that closes when an alarm occurs.
HI cc-mode	Lets you enter Acknowledge, Return, All Clear, or Never to define when to open the digital contact.
HI delay time	Lets you enter the amount of time the tag waits before generating an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
HI re-alarm time	Lets you enter the amount of time the tag waits before re-issuing an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
Low	Lets you enter the threshold for the alarm type. If the block's value exceeds this threshold, the block generates an alarm.
LO alarm priority	Lets you enter INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL to define the priority of the alarm type.
LO cc-tag	Lets you enter the name of a digital tag that closes when an alarm occurs.
LO cc-mode	Lets you enter Acknowledge, Return, All Clear, or Never to define when to open the digital contact.
LO delay time	Lets you enter the amount of time the tag waits before generating an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan

Field	Description
	time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
LO re-alarm time	Lets you enter the amount of time the tag waits before re-issuing an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:hh:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
Low Low	Lets you enter the threshold for the alarm type. If the block's value exceeds this threshold, the block generates an alarm.
LOLO alarm priority	Lets you enter INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL to define the priority of the alarm type.
LOLO cc-tag	Lets you enter the name of a digital tag that closes when an alarm occurs.
LOLO cc-mode	Lets you enter Acknowledge, Return, All Clear, or Never to define when to open the digital contact.
LOLO delay time	Lets you enter the amount of time the tag waits before generating an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:hh:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
LOLO re-alarm time	Lets you enter the amount of time the tag waits before re-issuing an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:hh:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.

Field	Description
Rate of Change	Lets you enter the threshold for the alarm type. If the block's value exceeds this threshold, the block generates an alarm.
ROC alarm priority	Lets you enter INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL to define the priority of the alarm type.
ROC cc-tag	Lets you enter the name of a digital tag that closes when an alarm occurs.
ROC cc-mode	Lets you enter Acknowledge, Return, All Clear, or Never to define when to open the digital contact.
ROC delay time	Lets you enter the amount of time the tag waits before generating an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
ROC re-alarm time	Lets you enter the amount of time the tag waits before re-issuing an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
DEV alarm limit	Lets you enter the threshold for the alarm type. If the block's value exceeds this threshold, the block generates an alarm.
DEV alarm priority	Lets you enter INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL to define the priority of the alarm type.
DEV cc-tag	Lets you enter the name of a digital tag that closes when an alarm occurs.

Field	Description
DEV delay time	Lets you enter Acknowledge, Return, All Clear, or Never to define when to open the digital contact.
DEV re-alarm time	Lets you enter the amount of time the tag waits before generating an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
Other Alarm Priority	Lets you enter the threshold for the alarm type. If the block's value exceeds this threshold, the block generates an alarm.
Other cc-tag	Lets you enter INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL to define the priority of the alarm type.
Other cc-mode	Lets you enter the name of a digital tag that closes when an alarm occurs.
Other delay time	Lets you enter Acknowledge, Return, All Clear, or Never to define when to open the digital contact.
Other re-alarm time	Lets you enter the amount of time the tag waits before generating an alarm. Enter a time in days, hours, minutes, and seconds, in the format dd:h-h:mm:ss, within the range of 00:00:00:00 to 03:00:00:00, when the block has time-based scan time. For exception based processing, leave the default entry, 00:00:00:00, which disable the field.
Deadband	Lets you enter the maximum fluctuation the tag accepts without re-issuing an alarm. As long as the fluctuation is within the dead band range, the block issues an alarm once, eliminating nuisance alarms. Once the alarm falls below the dead band and then exceeds the alarm limits, the block generates another alarm.

Field	Description
	Valid Entries Numeric value within the EGU range. **Example** If the High alarm limit is 80 and the dead band is 5, the tag does not re-issue an alarm after the one while the current value fluctuates between 75 and 85.
Const Contact Output	Selecting this option enables the tags to attempt to write the contact(s) with every scan, even if the value being written is unchanged. Otherwise, the AA tag only attempts to write to the defined contact tag when a value has changed and it needs to be written to the PLC. The write is a one-time attempt, so if it fails, the write will not be retried until the tag needs to write a new value. **Note:** There are four modes for the contacts - “Acknowledge”, “Return”, “All Clear”, and “Never” - that control when the contact is cleared. Since the contact mode of “Never” does not reset the contact, the Continuous Output option is not supported for this contact mode.
Suppress COMM Alarm	Select this option to separate the original alarm condition from the COMM alarm, and return the AA tag to the same state as it was prior to a COMM alarm. For example, if prior to the COMM alarm, the AA tag was an active alarm but already acknowledged, that is the state it should return to after communication is restored.

Field	Description
	Otherwise, AA tags handle one alarm at a time. As a result, it is possible that acknowledgement of a COMM alarm could cause the ACK bit in the PLC to be written, and the original alarm condition, if already acknowledged, could re-alarm.
As Event in Suspend	Select this option to enable the Event messaging (Suspend mode), which applies suppression behavior to disable alarm processing. When the tag is in suspend mode, the Alarm state is set to OK, the Alarm is an alarm message only and therefore, does not appear in the alarm summary. Alarm processing continues with each alarm state transition recorded in the alarm loggers but does not display in the alarm summary. The alarm state contact (tag) is not processed.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example**

Field	Description
	1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values

Field	Description
	that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Smoothing	Enables the tag's first order digital filter to reduce noise from the incoming signal. The tag filters the incoming signal by adding part of the previous output and part of the new input from the I/O driver, OPC server, or OPC UA server as the following formula shows: Output = (S/16)X1 + ((16-S)/16)X2 where:

Field	Description
	• s is the smoothing value entered in the Value field. • X1 is the initial value or previous output. • X2 is the new input from I/O driver or server.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

AI Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries**

Field	Description
	• 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries**

Field	Description
	• Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more informa-tion. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more deci-mal places in the Low Limit field. If you are using scientific notation, up to six deci-mal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999.

Field	Description
	• Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius,

Field	Description
	Note: This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Scale Enabled	Lets you enable or disable scaling for this tag. Enabling scaling allows the system to convert the data received from input sensors to designated data ranges. **Note:** Linear scaling and signal conditioning cannot be applied simultaneously. If you select Linear Scaling, verify that Signal Conditioning is set to NONE. **Example** Scaling allows conversion of temperature data received in Fahrenheit to an output which uses Celsius values.
Scale Clamping	Lets you enable or disable clamping for this tag. When you enable clamping, any value the tag receives is limited to the raw range. Any value the tag sends is limited to the scaled range. **Note:** Do not enable clamping unless it is necessary. Because clamping limits the data received and sent, some data may be missed by the tag.

Field	Description
Raw Low	Lets you specify the low limit for the values received by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Raw High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Use Low/High Limits	Enables the tag to use the range specified in the Engineering Units fields as the output values. Typically, EGU values normally reflect the expected operating ranges, or the Scale Low and Scale High

Field	Description
	values for the tag. However, the EGU values also dictate behavior in other areas such as alarming. By allowing the Scale Low and Scale High values to be set to values other than the EGU values, you can further manage conditions when alarms would be generated. **Note:** If you are Using this tag for charts, make sure to select Use EGU. Selecting this option will make it easier for you to see the changes within the expected range in your chart, because the chart axes will correspond to your expected range and not the entire range of the sensors. The smaller range of the chart makes changes in values more obvious.
Scale Low	Lets you specify the low limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).

Field	Description
	Note: Changes made to this field are not reflected in the data until after the next tag scan.
Scale High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** Changes made to this field are not reflected in the data until after the next tag scan.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries**

Field	Description
	ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).

Field	Description
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Alarm Limits

Field	Description
Low Low	Lets you enter the tag's critically low values. When the tag's value falls below this limit, the tag generates an alarm. **Valid Entries** A critically low value within the tag's engineering units range. **Example** If a temperature of 25 degrees indicates that a cooling water flow is frozen, you could enter a value of 30 degrees for your Low Low alarm.
Low	Lets you enter the tag's low process values. When the tag's value falls below this limit, the tag generates an alarm. **Valid Entries** A low value within the tag's engineering units range. If you want to provide a warning that a value is approaching a critical low limit, enter a slightly higher value than the Low Low alarm. **Example** If a temperature of 35 degrees indicates that ice crystals are forming in a cooling water flow, you

Field	Description
	could enter a value of 40 degrees for your Low alarm.
High	Lets you enter the tag's high process values. When the tag's value exceeds this limit, the tag generates an alarm. **Valid Entries** A high value within the tag's engineering units range. If you want to provide a warning that a value is approaching a critically high limit, enter a slightly lower value than the High High alarm. **Example** If a bearing temperature of 80 degrees indicates machine wear, you could enter a value of 75 degrees for your High alarm.
High High	Lets you enter the tag's critically high values. When the tag's value exceeds this limit, the tag generates an alarm. **Valid Entries** A critically high value within the tag's engineering units range. **Example** If a bearing temperature of 90 degrees indicates imminent seizure, you could enter a value of 85 degrees for your High High alarm.
Rate of Change	Lets you enter the maximum, acceptable change in a tag's value. If the tag's current value changes by more than the specified value within one scan period, the tag generates a Rate of Change alarm. **Valid Entries**

Field	Description
	A value within the tag's engineering units range, to be checked per scan period. Enter 0 to disable this alarm. **Example** To generate an alarm due to a fluctuation of more than 20 RPMs on a speed drive since the last scan period, you would enter a 20 in this field.
Deadband	Lets you enter the maximum fluctuation the tag accepts without re-issuing an alarm. As long as the fluctuation is within the dead band range, the tag issues an alarm once, eliminating nuisance alarms. Once the alarm falls below the dead band and then exceeds the alarm limits, the tag generates another alarm. **Valid Entries** Numeric value within the EGU range. **Example** If the High alarm limit is 80 and the dead band is 5, the tag does not re-issue an alarm after the one while the current value fluctuates between 75 and 85.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.

Field	Description
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incom-

Field	Description
	ing data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries**

Field	Description
	Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Field	Description
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.

Field	Description
Smoothing	Enables the tag's first order digital filter to reduce noise from the incoming signal. The tag filters the incoming signal by adding part of the previous output and part of the new input from the I/O driver, OPC server, or OPC UA server as the following formula shows: Output = (S/16)X1 + ((16-S)/16)X2 where: • s is the smoothing value entered in the Value field. • X1 is the initial value or previous output. • X2 is the new input from I/O driver or server.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries**

Field	Description
	None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

AIS Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will

Field	Description
	cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you se-

Field	Description
	lect a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries**

Field	Description
	Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Limits and Scaling

Field	Description
Low Limit	Low EGU limit. The low end of the user readable value.
High Limit	High EGU limit. The high end of the user readable value.
Units	Description of the EGU range (e.g. DEGF, GPH, PSI, etc)
Low Count	The low 'counts' range for the raw input which corresponds to the low EGU range of the user readable value. Note that if LOW and HIGH counts are equal then the input scaling is disabled and the block will function like an ordinary AI block.
High Count_CH	The high 'counts' range for the raw input which corresponds to the high EGU range of the user readable value. Note that if LOW and HIGH counts are equal then the input scaling is disabled and the block will function like an ordinary AI block.
Clamp to Range	If set (and the low/high count is in use) then the input is clamped to the range of the low/hi count. For example if the low count is 819 and the raw input from the driver is 123 then the input will be changed to 819 - the lowest allowable input. If this function is disabled then the raw input will not be clamped.

Field	Description
Alarm on Range	If set (and the low/high count is in use) then if the input is outside the lo/hi count range then an UnderRange or OverRange alarm is generated for the block.
Low Operator Limit	Low operator output limit. Output clamping is enabled if the LOLIM and HILIM values are different. Values sent to the A_CV or F_CV fields of the block will be checked against these limits. Normally, the values will be rejected if they are outside these limits.
High Operator Limit	High operator output limit. Output clamping is enabled if the LOLIM and HILIM values are different. Values sent to the A_CV or F_CV fields of the block will be checked against these limits. Normally the values will be rejected if they are outside these limits.
Clamp Output	If set then an output entered by the operator or some other application is clamped to the operator output limits and then sent to the driver. If clear then any output outside the operator limits is rejected with an error. **CAUTION:** This option should generally be CLEAR (the default state) to prevent unwanted values from being sent to equipment.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with

Field	Description
	the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL

Field	Description
	Note: To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Alarm Limits

Field	Description
Low Low	Lets you enter the tag's critically low values. When the tag's value falls below this limit, the tag generates an alarm. **Valid Entries** A critically low value within the tag's engineering units range. **Example** If a temperature of 25 degrees indicates that a cooling water flow is frozen, you could enter a value of 30 degrees for your Low Low alarm.
Low	Lets you enter the tag's low process values. When the tag's value falls below this limit, the tag generates an alarm. **Valid Entries** A low value within the tag's engineering units range. If you want to provide a warning that a value is approaching a critical low limit, enter a slightly higher value than the Low Low alarm. **Example** If a temperature of 35 degrees indicates that ice crystals are forming in a cooling water flow, you could enter a value of 40 degrees for your Low alarm.

Field	Description
High	Lets you enter the tag's high process values. When the tag's value exceeds this limit, the tag generates an alarm. **Valid Entries** A high value within the tag's engineering units range. If you want to provide a warning that a value is approaching a critically high limit, enter a slightly lower value than the High High alarm. **Example** If a bearing temperature of 80 degrees indicates machine wear, you could enter a value of 75 degrees for your High alarm.
High High	Lets you enter the tag's critically high values. When the tag's value exceeds this limit, the tag generates an alarm. **Valid Entries** A critically high value within the tag's engineering units range. **Example** If a bearing temperature of 90 degrees indicates imminent seizure, you could enter a value of 85 degrees for your High High alarm.
Rate of Change	Lets you enter the maximum, acceptable change in a tag's value. If the tag's current value changes by more than the specified value within one scan period, the tag generates a Rate of Change alarm. **Valid Entries** A value within the tag's engineering units range, to be checked per scan period. Enter 0 to disable this alarm. **Example** To generate an alarm due to a fluctuation of more than 20 RPMs on a speed drive since the last scan period, you would enter a 20 in this field.
Deadband	Lets you enter the maximum fluctuation the tag accepts without re-issuing an alarm. As long as the fluctuation is within the dead band range, the tag issues an alarm once, eliminating nui-

Field	Description
	sance alarms. Once the alarm falls below the dead band and then exceeds the alarm limits, the tag generates another alarm. **Valid Entries** Numeric value within the EGU range. **Example** If the High alarm limit is 80 and the dead band is 5, the tag does not re-issue an alarm after the one while the current value fluctuates between 75 and 85.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that

Field	Description
	the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan.

Field	Description
	Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

AO Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries**

Field	Description
	• Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999.

Field	Description
	• Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius,

Field	Description
	Note: This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Scale Enabled	Lets you enable or disable scaling for this tag. Enabling scaling allows the system to convert the data received from input sensors to designated data ranges. **Note:** Linear scaling and signal conditioning cannot be applied simultaneously. If you select Linear Scaling, verify that Signal Conditioning is set to NONE. **Example** Scaling allows conversion of temperature data received in Fahrenheit to an output which uses Celsius values.
Scale Clamping	Lets you enable or disable clamping for this tag. When you enable clamping, any value the tag receives is limited to the raw range. Any value the tag sends is limited to the scaled range. **Note:** Do not enable clamping unless it is necessary. Because clamping limits the data received and sent, some data may be missed by the tag.

Field	Description
Raw Low	Lets you specify the low limit for the values received by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Raw High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Use Low/High Limits	Enables the tag to use the range specified in the Engineering Units fields as the output values. Typically, EGU values normally reflect the expected operating ranges, or the Scale Low and Scale High

Field	Description
	values for the tag. However, the EGU values also dictate behavior in other areas such as alarming. By allowing the Scale Low and Scale High values to be set to values other than the EGU values, you can further manage conditions when alarms would be generated. **Note:** If you are Using this tag for charts, make sure to select Use EGU. Selecting this option will make it easier for you to see the changes within the expected range in your chart, because the chart axes will correspond to your expected range and not the entire range of the sensors. The smaller range of the chart makes changes in values more obvious.
Scale Low	Lets you specify the low limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).

Field	Description
	Note: Changes made to this field are not reflected in the data until after the next tag scan.
Scale High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** Changes made to this field are not reflected in the data until after the next tag scan.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries**

Field	Description
	ALL or up to 15 alarm area names.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations as alarms for a given tag but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text tags have event messaging capabilities. **Note:** Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for exception-based chains, one shot chains, and stand-alone output blocks.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector.

Field	Description
	Valid Entries Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value.

Field	Description
	Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during

Field	Description
	run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Output Reverse	Lets you specify the maximum rate of change you want to allow between successive outputs. **Valid Entries** A value between the Low and High Limit (EGU) fields or a 0 to allow any amount of change.
Initial Value	Lets you specify the value that the Scan, Alarm, and Control (SAC) program sends to the process hardware. SAC sends the data the first time that it reads the block. If an Initial Value is not defined, SAC does not output a value during initialization. **Valid Entries** A value between the Low and High Limit (EGU) fields.
Low Operator Limit	Lets you specify the lowest value that the tag accepts from another tag or from an operator. **Valid Entries** A value between the Low and High Limit (EGU) fields. If appropriate, you can use the Low Limit (EGU) for this value.
High Operator Limit	Lets you specify the highest value that the tag can accept from another tag or from an operator.

Field	Description
	Valid Entries A value between the Low and High Limit (EGU) fields. If appropriate, you can use the High Limit (EGU) for this value.
Rate Limit	Lets you specify the maximum rate of change you want to allow between successive outputs. **Valid Entries** A value between the Low and High Limit (EGU) fields or a 0 to allow any amount of change.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.

Field	Description
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

AR Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will

Field	Description
	cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you se-

Field	Description
	lect a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10.

Field	Description
	If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field.

Field	Description
	If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Scale Enabled	Lets you enable or disable scaling for this tag. Enabling scaling allows the system to convert the data received from input sensors to designated data ranges. **Note:** Linear scaling and signal conditioning cannot be applied simultaneously. If you select Linear Scaling, verify that Signal Conditioning is set to NONE. **Example** Scaling allows conversion of temperature data received in Fahrenheit to an output which uses Celsius values.

Field	Description
Scale Clamping	Lets you enable or disable clamping for this tag. When you enable clamping, any value the tag receives is limited to the raw range. Any value the tag sends is limited to the scaled range. **Note:** Do not enable clamping unless it is necessary. Because clamping limits the data received and sent, some data may be missed by the tag.
Raw Low	Lets you specify the low limit for the values received by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Raw High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. **Valid Entries**

Field	Description
	• Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).
Use Low/High Limits	Enables the tag to use the range specified in the Engineering Units fields as the output values. Typically, EGU values normally reflect the expected operating ranges, or the Scale Low and Scale High values for the tag. However, the EGU values also dictate behavior in other areas such as alarming. By allowing the Scale Low and Scale High values to be set to values other than the EGU values, you can further manage conditions when alarms would be generated. **Note:** If you are Using this tag for charts, make sure to select Use EGU. Selecting this option will make it easier for you to see the changes within the expected range in your chart, because the chart axes will correspond to your expected range and not the entire range of the sensors. The smaller range of the chart makes changes in values more obvious.
Scale Low	Lets you specify the low limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data

Field	Description
	is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** Changes made to this field are not reflected in the data until after the next tag scan.
Scale High	Lets you specify the high limit for the values sent by the tag. Usually, this value corresponds to the specifications of the hardware from which the data is received. This field is only available if you did not enable Use EGU. **Valid Entries** • Standard Integer • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).

Field	Description
	Note: Changes made to this field are not reflected in the data until after the next tag scan.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms.

Field	Description
	Example 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incom-

Field	Description
	ing data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Output Enable	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations as alarms for a given block but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text blocks have event messaging capabilities. **Note:** Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for exception-based chains, one shot chains, and stand-alone output blocks.
I/O Address Type	Lets you specify the number format of the block's starting address. **Valid Entries**

Field	Description
	Hex, Octal, or Decimal
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries**

Field	Description
	Text, up to 80 characters.

AR2 Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @

Field	Description
	Examples AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.

Field	Description
	CAUTION: Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Limits and Scaling

Field	Description
Low Limit	Low EGU limit. The low end of the user readable value.
High Limit	High EGU limit. The high end of the user readable value.
Units	Description of the EGU range (for example: DEGF, GPH, PSI).

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that

Field	Description
	the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
I/O Address Type	Lets you enter the base number system used by the I/O Address field. Valid entries include: Decimal, Hexadecimal, or Octal.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations

Field	Description
	as alarms for a given block but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text blocks have event messaging capabilities. **Note:** Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for exception-based chains, one shot chains, and stand-alone output blocks.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you

Field	Description
	want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

BB Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal

Field	Description
	databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
Activate High Contact	Enables or disables the High Contact Data fields.

Field	Description
High Contact Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the block. The selected driver or server enables the block to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available drivers in the SCU.
High Contact Driver I/O Address	Lets you enter the location in the process hardware where data for this block is saved and where output is sent. In an On-Off Control block, specify the address of the digital point you want opened and closed based on the Turn on Above and Turn off Below values. **Valid Entries** Depends on your driver. Consult your I/O driver manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to blocks when using exception-based and time-based processing. Doing so will cause the exception-based blocks to occasionally miss a value.
High Contact Hardware Options	Lets you select any specific device control addressing format that the block uses to communicate with process hardware on the plant floor. **Valid Entries** For most process hardware, this field is usually left blank. Consult your I/O driver manual for the applicable hardware code if necessary.

Field	Description
High Contact - Turn On Above	Lets you specify the highest acceptable analog value for the High Contact Data. When the analog input goes above this value, the High Contact I/O address closes. **Valid Entries** Enter the number that represents this value according to the Low and High Limits (EGU) of the analog input.
High Contact - Turn On Below	Lets you specify the lowest acceptable analog value for the High Contact Data. When the analog input falls below this value, the High Contact I/O address opens. **Valid Entries** The number that represents this value according to the Low and High Limits (EGU) of the analog input.
Activate Low Contact	Enables or disables the Low Contact Data fields. **Valid Entries** Select the check box to use the Low Contact Data fields and provide output to a second digital I/O. Clear the check box to suppress them and use your analog input as the basis of a single digital output.
Low Contact Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the block. The selected driver or server enables the block to communicate with process hardware on the plant floor. Before you can select an I/O driver or OPC server, you must install it and add it to the available drivers in the SCU.
Low Contact I/O Address	Lets you enter the location in the process hardware where data for this block is saved and where out-

Field	Description
	put is sent. In an On-Off Control tag, specify the address of the digital point you want opened and closed based on the Turn on Below and Turn off Above values. **Valid Entries** Depends on your driver. Consult your I/O driver manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to blocks when using exception-based and time-based processing. Doing so will cause the exception-based blocks to occasionally miss a value.
Low Contact Hardware Options	Lets you select any specific device control addressing format that the block uses to communicate with process hardware on the plant floor. **Valid Entries** For most process hardware, this field is usually left blank. Consult your I/O driver manual for the applicable hardware code if necessary.
Low Contact - Turn On Above	Lets you specify the highest acceptable analog value for the Low Contact Data. When the analog input goes above this value, the Low Contact I/O address opens. **Valid Entries** Enter the number that represents this value according to the Low and High Limits (EGU) of the analog input.

Field	Description
Low Contact - Turn On Below	Lets you specify the lowest acceptable analog value for the Low Contact Data. When the analog input falls below this value, the Low Contact I/O address closes. **Valid Entries** Enter the number that represents this value according to the Low and High Limits (EGU) of the analog input.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag

Field	Description
	clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150.

Field	Description
	If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Field	Description
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example**

Field	Description
	1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values

Field	Description
	that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
One Shot	Lets you specify how often to activate the four contact data fields. When selected, the On-Off Control tag sends OPEN or CLOSE commands to the High and Low Contacts only when there is a change of state, rather than each time the tag executes. When cleared, the check box sends the commands every scan period.
Invert Output	Inverts the tag's output value. For example, if you want the I/O driver to return a closed contact as a logical 0 and an open contact as a logical 1, click the check box. Alternatively, to return a closed contact as a logical 1 (normal conditions) and an open contact as a logical 0, clear the check box.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area.

Field	Description
	This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

BL Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it.

Field	Description
	Valid Entries Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Inputs

Field	Description
Input A	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Input B	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Input C	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Input D	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label

Field	Description
	in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Input E	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Input F	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Input G	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries**

Field	Description
	A label of up to 16 characters. **Examples** Open, Off
Input H	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Output Calculation	Lets you specify the Boolean block equation. If the equation is true, a value of 1 is passed to the next block. If the equation is false, a value of 0 is passed to the next tag. **Valid Entries** Write the equation using the input letters (A - H) that correspond to the defined Input fields. The calculation can use the input values more than once. **Example** (C+(A+B))

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 1 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact.

Field	Description
	Valid Entries A label of up to 16 characters. **Examples** Close, On.
Close Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Alarm Limits

Field	Description
Low Low	Lets you enter the tag's critically low values. When the tag's value falls below this limit, the tag generates an alarm.

Field	Description
	Valid Entries A critically low value within the tag's engineering units range. **Example** If a temperature of 25 degrees indicates that a cooling water flow is frozen, you could enter a value of 30 degrees for your Low Low alarm.
Low	Lets you enter the tag's low process values. When the tag's value falls below this limit, the tag generates an alarm. **Valid Entries** A low value within the tag's engineering units range. If you want to provide a warning that a value is approaching a critical low limit, enter a slightly higher value than the Low Low alarm. **Example** If a temperature of 35 degrees indicates that ice crystals are forming in a cooling water flow, you could enter a value of 40 degrees for your Low alarm.
High	Lets you enter the tag's high process values. When the tag's value exceeds this limit, the tag generates an alarm. **Valid Entries** A high value within the tag's engineering units range. If you want to provide a warning that a value is approaching a critically high limit, enter a slightly lower value than the High High alarm. **Example**

Field	Description
	If a bearing temperature of 80 degrees indicates machine wear, you could enter a value of 75 degrees for your High alarm.
High High	Lets you enter the tag's critically high values. When the tag's value exceeds this limit, the tag generates an alarm. **Valid Entries** A critically high value within the tag's engineering units range. **Example** If a bearing temperature of 90 degrees indicates imminent seizure, you could enter a value of 85 degrees for your High High alarm.
Rate of Change	Lets you enter the maximum, acceptable change in a tag's value. If the tag's current value changes by more than the specified value within one scan period, the tag generates a Rate of Change alarm. **Valid Entries** A value within the tag's engineering units range, to be checked per scan period. Enter 0 to disable this alarm. **Example** To generate an alarm due to a fluctuation of more than 20 RPMs on a speed drive since the last scan period, you would enter a 20 in this field.
Deadband	Lets you enter the maximum fluctuation the tag accepts without re-issuing an alarm. As long as the fluctuation is within the dead band range, the tag issues an alarm once, eliminating nuisance alarms. Once the alarm falls below the dead band and then

Field	Description
	exceeds the alarm limits, the tag generates another alarm. **Valid Entries** Numeric value within the EGU range. **Example** If the High alarm limit is 80 and the dead band is 5, the tag does not re-issue an alarm after the one while the current value fluctuates between 75 and 85.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.

Field	Description
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value.

Field	Description
	Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the downstream Statistical Control tag. No other tag type is valid.

Field	Description
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Process by Exception	Enables exception-based processing for the block.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any blocks chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-

Field	Description
	minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is re-loaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

BPL Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Used to clamp PV, SP and internal calculations. Should match the output EGU of the upstream block. Inverted EGU range is not supported by the BPL block. The HI egu must be larger than the LO egu.
High Limit	Used to clamp PV, SP and internal calculations. Should match the output EGU of the upstream block. Inverted EGU range is not supported by the BPL block. The HI egu must be larger than the LO egu.
Units	For display purposes.

Breakpoints

Field	Description
Input 00-10	The input to the block is compared to each of these input breakpoints. The first value which exceeds the actual input determines the Output and Slope to be used. For this reason the inputs should generally be entered in increasing order. The INPUT values can be any float.
Output 00-19	The OUTPUTS correspond to the inputs. Once the breakpoint interval is determined by checking the input table the corresponding OUTPUT is used as the base of the computed output value. The OUTPUT values can be any float.
Slope 00-19	The SLOPE is used to determine how much to add to the OUTPUT. The SLOPE values can be any float.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes.

Field	Description
	Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.

CA Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs.

Field	Description
	Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.

Field	Description
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Inputs

Field	Description
Input A	Lets you specify the inputs to the Calculation tag. **Valid Entries** The following are valid entries for defining your equation with Input entries: • Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV. **Note:** If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name. Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point. **Note:** Input field A always represents the output of the upstream block (previous block). **Example**

Field	Description
	To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Input B	Lets you specify the inputs to the Calculation tag. **Valid Entries** The following are valid entries for defining your equation with Input entries: • Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV. **Note:** If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name. Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point. **Note:** Input field A always represents the output of the upstream block (previous block). **Example** To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Input C	Lets you specify the inputs to the Calculation tag.

Field	Description
	Valid Entries The following are valid entries for defining your equation with Input entries: • Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV. **Note:** If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name. Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point. **Note:** Input field A always represents the output of the upstream block (previous block). **Example** To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Input D	Lets you specify the inputs to the Calculation tag. **Valid Entries** The following are valid entries for defining your equation with Input entries:

Field	Description
	• Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV. **Note:** If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name. Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point. **Note:** Input field A always represents the output of the upstream block (previous block). **Example** To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Input E	Lets you specify the inputs to the Calculation tag. **Valid Entries** The following are valid entries for defining your equation with Input entries: • Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV.

Field	Description
	Note: If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name. Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point. **Note:** Input field A always represents the output of the upstream block (previous block). **Example** To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Input F	Lets you specify the inputs to the Calculation tag. **Valid Entries** The following are valid entries for defining your equation with Input entries: • Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV. **Note:** If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name.

Field	Description
	Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point. **Note:** Input field A always represents the output of the upstream block (previous block). **Example** To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Input G	Lets you specify the inputs to the Calculation tag. **Valid Entries** The following are valid entries for defining your equation with Input entries: • Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV. **Note:** If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name. Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point.

Field	Description
	Note: Input field A always represents the output of the upstream block (previous block). **Example** To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Input H	Lets you specify the inputs to the Calculation tag. **Valid Entries** The following are valid entries for defining your equation with Input entries: • Constants (a floating point number). • Tag names (representing the tag's current value of the tag), including the Calculation block itself. For example, AI1 to represent AI1.F_CV. **Note:** If you enter a tag name without entering a field name, iFIX automatically enters F_CV as the default field name. Tag and field pairs represent the value of the specified field. For example, PID1.F_TV1 to access the tag's set point. **Note:** Input field A always represents the output of the upstream block (previous block). **Example**

Field	Description
	To input the value of the Statistical Data block's XBARBAR, you would enter SD1.F_XBB. Note the period between the block and field names.
Output Calculation	Lets you specify the Calculation block equation. **Valid Entries** An equation using the input letters (A - H) that correspond to the defined Input fields. The input letters may be used more than once. **Note:** A mathematical overflow (value >1038), underflow (below 10-37), or division by zero causes a Calc error status in the upstream block.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).

Field	Description
	Note: The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult

Field	Description
	your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.

Field	Description
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incom-

Field	Description
	ing data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries**

Field	Description
	Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Field	Description
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries**

Field	Description
	None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

CTR Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Used to clamp PV, SP and internal calculations. Should match the output EGU of the upstream block. Inverted EGU range is not supported by the PI2 block. The HI egu must be larger than the LO egu.
High Limit	Used to clamp PV, SP and internal calculations. Should match the output EGU of the upstream block. Inverted EGU range is not supported by the PI2 block. The HI egu must be larger than the LO egu.
Units	For display purposes.
Limit Value	A value which if reached or exceeded will generate an alarm. This will still function if set to zero. To disable alarming simply clear the Alarm Enable Field.
Gate tag	A TAG:FIELD specifier (normally an F_CV). If non-zero then the counting logic is enabled. If this field is blank then the gate is considered TRUE. Note that a transition to true on the gate will NOT generate a count even if the input is in the active state.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries**

Field	Description
	INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if

Field	Description
	this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Mode	Count on transition to OPEN, CLOSE or COS (any transition).
Passed Value	INPUT passes raw input (converted to 0/1). ALM passes Current Alarm (converted to 0/1). LIMIT passes 'Limit Reached' (as 0/1 which is checked regardless of Alarm Enable, Auto and Gate states).

Field	Description
	COUNT passes current value of Counter. Note that the counter value is converted to Float. Precision may be lost. Also note that some downstream blocks (such as AO) may clamp this to their EGU or OPERATOR limits.
Startup Mode	Initial Auto/ Manual Status. When in Automatic the output signal is generated. When in Manual the output signal is 'paused'.
Clear on Startup	Should the count be cleared when the chain goes on scan? If not then the count is retained while the block is off scan. Also on system reload, the block will retain the value it had the last time the database was saved to disk (by DBB).
Chain on Transition	If set to YES, the NEXT block will execute only if a transition is counted (requires AUTO and GATE are true). **Note:** A manual change to count via the A_-COUNT field will NOT satisfy this condition.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default.

Field	Description
	Note: Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information.

Field	Description
	Valid Entries Text, up to 80 characters.

D16 Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name:

Field	Description
	~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
Mode	The scan time determines how often SAC processes the block and sends the current value to the next block in the chain (ANALOG or DIGITAL). SAC processes all secondary blocks chained to a primary block according to the primary block's scan time. Exception based scanning is supported by this block when used in ANALOG mode. Support for exceptions is a function of the I/O Driver. Most but not all drivers will support exception based processing. Exception based processing is NOT supported in DIGITAL mode.

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
Bitcount	Number of bits to read when in digital mode (default = 16). This is used ONLY when mode is set to DIGITAL and is intended for those rare cases when an error might be generated by reading too many bits (for example you want to read only the last 7 bits in a poll record).
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example**

Field	Description
	0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Device States

Field	Description
Status String 0-15	Shows the 16 strings associated with the bits. The strings can be up to 40 bytes (plus NUL). Note that if the string contains the special vertical bar character '|' then the characters to the left of this will represent the ON state of the input and the characters to the right will represent the OFF state of the input. If it does not contain this character then the entire string represents the ON state and a NULL string represents the OFF state.
Alarm 0-15	Indicate which bits should generate an alarm.

Field	Description
Invert 0-15	Indicates which bits should be inverted before being processed.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does ap-

Field	Description
	pear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person perform-

Field	Description
	ing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to

Field	Description
	place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Realarm Time	If set, then the driver will generate a new alarm message (and new alarm bit) whenever any individual bit goes into alarm. If clear then entire block is either in alarm or not.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button.

Field	Description
	Note: In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

DA Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs.

Field	Description
	Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.

Field	Description
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag

Field	Description
	or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.

Field	Description
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Close Tag	Lets you enter a descriptive label for the logical 1 value received by the tag . You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Close, On.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Field	Description
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).

Field	Description
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.
Alarm Type	Lets you specify the type of condition that generates an alarm from the tag. When an alarm occurs, it is sent to all locations specified in the Alarm Areas field. **Valid Entries** Open, Close, Change of State, None
Contact Tag	Lets you specify the name of the digital block that the Digital Alarm block closes when the alarm specified in the Alarm Type area occurs. **Valid Entries** A Digital Output or Digital Input block, in Manual mode.
Contact Mode	Lets you specify when to open the digital tag entered in the Contact Name field. **Valid Entries** Acknowledge, Return, All Clear, and Never
Cont Contact Output	Selecting this option enables the tags to attempt to write the contact with every scan, even if the value being written is unchanged. Otherwise, the DA tag only attempts to write to the defined contact tag when a value has changed and it needs to be written to the PLC. The write is a one-time attempt, so if it fails, the write will not be retried until the tag needs to write a new value.

Field	Description
	Note: There are four modes for the contacts - “Acknowledge”, “Return”, “All Clear”, and “Never” - that control when the contact is cleared. Since the contact mode of “Never” does not reset the contact, the Continuous Output option is not supported for this contact mode.
Remote Ack Tag	Lets you specify the tag and field name pair to use for alarm acknowledgment from a remote site. When the tag and field's value changes from zero to a value greater than zero, the Digital Alarm tag acknowledges the alarm. **Valid Entries** Any floating point block and field name pair in the tag.field format. **Note:** When the Digital Alarm tag uses exception-based processing, acknowledging an alarm from an operator display immediately triggers processing of the block. Acknowledging the alarm with the Acknowledge Tag field does not trigger SAC to process the Digital Alarm tag.
Alarm Suspension Tag	Provides intelligent alarming by defining a tag and field name pair to control alarm processing for this tag. When the tag and field's value is zero, the Digital Alarm tag processes alarms. When the value is other than zero, either a positive or negative number, the Digital Alarm tag suspends alarms

Field	Description
	and generates a suspend message to the enabled alarm destinations. **Valid Entries** Any floating point tag and field name (F_CV) pair in the tag.field format. **Note:** If you specify the same block and field name pair for multiple Digital Alarm blocks, you can suspend alarms within one or more alarm areas. This is an optional feature.
Delay Time	Lets you specify the amount of time the Digital Alarm tag waits before generating an alarm. If an alarm condition persists beyond the specified delay time, the tag generates the alarm. **Valid Entries** For time-based processing, use a time in days, hours, minutes, and seconds, in the format dd:hh:mm:ss, within the range 00:00:00:00 to 03:00:00:00. For exception-based processing, leave the default entry, 00:00:00:00. This disables any delay. **Note:** The value in the Delay Time field does not apply to Change of State (COS) alarms.
Realarm Time	Lets you specify the time interval the Digital Alarm tag waits before re-issuing an alarm. If an alarm condition persists at the time specified, the tag

Field	Description
	re-issues the alarm. Any contact associated with each alarm type is closed. **Valid Entries** For time-based processing, use a time in days, hours, minutes, and seconds, in the format dd:hh:mm:ss, within the range 00:00:00:00 to 03:00:00:00. For exception-based processing, leave the default entry, 00:00:00:00. This disables any delay.
Suppress COMM Alarm	Select this option to separate the original alarm condition from the COMM alarm, and return the DA tag to the same state as it was prior to a COMM alarm. For example, if prior to the COMM alarm, the DA tag was an active alarm but already acknowledged, that is the state it should return to after communication is restored. Otherwise, DA tags handle one alarm at a time. As a result, it is possible that acknowledgement of a COMM alarm could cause the ACK bit in the PLC to be written, and the original alarm condition, if already acknowledged, could re-alarm.
As Event in Suspend	Select this option to enable the Event messaging (Suspend mode), which applies suppression behavior to disable alarm processing. When the tag is in suspend mode, the Alarm state is set to OK, the Alarm is an alarm message only and therefore, does not appear in the alarm summary. Alarm processing continues with each alarm state transition recorded in the alarm loggers but does not display in the alarm summary. The alarm state contact (tag) is not processed.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes.

Field	Description
	If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.

Field	Description
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if

Field	Description
	this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Invert Output	Inverts the output value so that if the value of the tag is 0, it outputs a 1. You can use this option to send a 0 to close a contact and send a 1 to open it.

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries**

Field	Description
	None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

DC Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Programming Statements

Field	Description
Step 0 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 1 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 2 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries**

Field	Description
	The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 3 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 4 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 5 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 6 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries**

Field	Description
	The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 7 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 8 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 9 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.
Step 10 Command	Displays the commands and arguments for each Device Control block. Use the Browse (...) button to select from a list of valid commands. **Valid Entries**

Field	Description
	The list box can include up to 12 programming statements each containing up to 34 alphanumeric characters.

IO Addressing

Field	Description
Input Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver or OPC server, you must install it and add it to the available drivers in the SCU.
Input Address 1 - 16	Lets you specify the addresses of the digital input points that the Device Control block monitors. **Valid Entries** Up to 16 hardware input bits for input addresses. If necessary, consult your OPC, OPC UA, or I/O driver manual for more information on specifying I/O addresses. **Note:** All input addresses must have the same hardware options and all output addresses must have the same hardware options. However, the input and output hardware options do not need to be identical.
Input Hardware Options	Lets you select any specific device control addressing format that the block uses to communicate with process hardware on the plant floor. **Valid Entries**

Field	Description
	For most process hardware, this field is usually left blank. Consult your I/O driver, OPC, or OPC UA manual for the applicable hardware code if necessary.
Output Driver	Lets you select an I/O driver, OPC UA, or OPC server for the tag. The selected driver or server enables the block to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPCUA server, or OPC server, you must install it and add it to the available drivers in the SCU.
Output Address 1 - 8	Lets you specify the addresses of the digital output points that the Device Control block monitors. **Valid Entries** Up to 8 hardware output bits for output addresses. If necessary, consult your OPC, OPC UA, or I/O driver manual for more information on specifying I/O addresses. **Note:** All input addresses must have the same hardware options and all output addresses must have the same hardware options. However, the input and output hardware options do not need to be identical.
Output Hardware Options	Lets you select any specific device control addressing format that the tag uses to communicate with process hardware on the plant floor. **Valid Entries** For most process hardware, this field is usually left blank. Consult your I/O driver, OPC, or OPC UA

Field	Description
	manual for the applicable hardware code if necessary.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes.

Field	Description
	If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.

Field	Description
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if

Field	Description
	this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts

Field	Description
	or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Initial Value	Controls the status of digital points on the hardware when the Scan, Alarm, and Control (SAC) program is first started. **Valid Entries** A valid contact pattern. **Example** A typical contact pattern entry in the Initial Value Field would look like the following example: OOCCXXXX This entry directs the digital points addressed in the 07 and 06 output Addresses fields to Open, the 05 and 04 fields to Close, and the 03 and 00 fields to remain in their present state.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area.

Field	Description
	This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the block and any tags chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example**

Field	Description
	0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

DI Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it.

Field	Description
	Valid Entries Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries**

Field	Description
	• 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label

Field	Description
	in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Close Tag	Lets you enter a descriptive label for the logical 1 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Close, On.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays

Field	Description
	to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations as alarms for a given tag but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text blocks have event messaging capabilities. **Note:** Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for exception-based chains, one shot chains, and stand-alone output blocks.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged

Field	Description
	and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Alarm Type	Lets you specify the type of condition that generates an alarm from the tag. When an alarm occurs, it is sent to all locations specified in the Alarm Areas field. **Valid Entries** Open, Close, Change of State, None
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector.

Field	Description
	Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.

Field	Description
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less.

Field	Description
	Valid Entries Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Field	Description
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Invert Output	Inverts the output value so that if the value of the tag is 0, it outputs a 1. You can use this option to send a 0 to close a contact and send a 1 to open it.
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to

Field	Description
	place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the downstream Statistical Control tag. No other tag type is valid.

Field	Description
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

DO Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain spe-

Field	Description
	cial characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Close Tag	Lets you enter a descriptive label for the logical 1 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters.

Field	Description
	Examples Close, On.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations as alarms for a given tag but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text tags have event messaging capabilities. **Note:** Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for exception-based chains, one shot chains, and stand-alone output blocks.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes.

Field	Description
	If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.

Field	Description
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if

Field	Description
	this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Invert Output	Inverts the output value so that if the value of the tag is 0, it outputs a 1. You can use this option to send a 0 to close a contact and send a 1 to open it.
Write if Different	Writes a value only if it is different than the current value.
Initial Value	Lets you specify the value that is sent to the process hardware the first time the Scan, Alarm, and Control (SAC) program processes the tag. If an

Field	Description
	Initial Value is not defined, SAC does not output a value during initialization. **Valid Entries** A value between the Low and High Limit (EGU) fields.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

DR Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Close Tag	Lets you enter a descriptive label for the logical 1 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters.

Field	Description
	Examples Close, On.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example**

Field	Description
	1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values

Field	Description
	that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Invert Output	Inverts the output value so that if the value of the tag is 0, it outputs a 1. You can use this option to send a 0 to close a contact and send a 1 to open it.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations as alarms for a given tag but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text blocks have event messaging capabilities. **Note:** Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for exception-based chains, one shot chains, and stand-alone output tags.

Field	Description
IO Address Type	Lets you enter the base number system used by the I/O Address field. **Valid Entries** Decimal, Hexadecimal, or Octal.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

DR2 Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Close Tag	Lets you enter a descriptive label for the logical 1 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters.

Field	Description
	Examples Close, On.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Invert Output	Inverts the output value so that if the value of the tag is 0, it outputs a 1. You can use this option to send a 0 to close a contact and send a 1 to open it.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations as alarms for a given block but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text blocks have event messaging capabilities.

Field	Description
	Note: Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for exception-based chains, one shot chains, and stand-alone output blocks.
I/O Address Type	Lets you enter the base number system used by the I/O Address field. Valid entries include: Decimal, Hexadecimal, or Octal.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information.

Field	Description
	Valid Entries Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

DT Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points

Field	Description
	(!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999.

Field	Description
	• Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38.

Field	Description
	• Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is

Field	Description
	used strictly as a display label to identify the engineering units.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples**

Field	Description
	If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value.

Field	Description
	Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person perform-

Field	Description
	ing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Dead Time	Lets you specify the length of the delay in seconds before transferring the value of upstream tag to the next tag in the chain. **Valid Entries**

Field	Description
	A value from 1 to 59 * scan_time, up to a maximum of 255 seconds, where scan_time is the scan time of the upstream block. **Examples** Assume you have an Analog Input tag chained to a Dead Time tag. If the Analog Input's scan time is 2 seconds, you can enter a dead time from 1 to 118 seconds. You can lengthen the dead time by either changing the scan time of the upstream block or by chaining multiple Dead Time blocks together. For example, using the previous example, if you change the scan time of the Analog Input block to 10 seconds, you can enter a dead time from 1 to 255 seconds.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag.

Field	Description
	Valid Entries None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

ETR Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag

Field	Description
	clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150.

Field	Description
	If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.

Field	Description
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incom-

Field	Description
	ing data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries**

Field	Description
	Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Buffer Clear Status	Lets you clear the block's data buffers every time the block is put on scan. **Valid Entries** Select the check box to clear data buffers. Clear it to suppress this feature.
Input Tag	Lets you specify the name of the tag and field that the Extended Trend tag stores. If this field is left blank, the Extended Trend block stores the value passed by the upstream block. **Valid Entries** A block and field name pair in the tag.field (F_CV) format. **Note:** To chain Extended Trend blocks, enter the Extended Trend tag's name and the field F_INP.

Field	Description
Compression Factor	Lets you specify the amount of data stored in the trend history by collecting the number of samples entered in the field, averaging them, and storing up to 600 averages in the trend history. **Valid Entries** A value from 1 - 255 that represents the number of samples to collect. **Example** If you have a scan time of 10 seconds and enter 5 as the Average Compress, the Extended Trend tag creates a trend history of 600 averages of 5 samples. In essence, the tag now represents a trend history of 3000 scan periods (5 x 600), or 500 minutes (30,000 seconds). **Note:** Using this field does not affect or delay the value passed by the Next tag field to the downstream tag.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default.

Field	Description
	Note: Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information.

Field	Description
	Valid Entries Text, up to 80 characters.

EV Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name:

Field	Description
	~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Event Definitions

Field	Description
If Condition 1	Lets you control the execution of the THEN or ELSE operation based upon a test expression on the previous tag. If the previous tag satisfies the conditions for a logical TRUE, the THEN operation is executed; otherwise, the ELSE operation is executed. **Note:** The command is latched. This means that the tag remembers the last operation and only performs a new operation if the condition has changed. **Valid Entries** An expression in the following format:

Field	Description
	Value or Alarm operator condition **Example** Value = 83.2 **Note:** You can use either one VALUE or one ALARM in each IF field. When entering your IF statement, leave a space between the VALUE/ALARM, the operator, and the condition entries.
Then	Lets you specify the operation that occurs when the test expression in the IF field is TRUE. This operation executes only if the condition has changed. **Valid Entries** An expression in the following format: command tag **Example** RUN PROG1 **Note:** You must enter the name of an existing tag. iFIX does not notify you that the specified tag does not exist until the Event Action block goes on scan. If you specify a nonexistent tag, an alarm is sent to all of the node's active alarm destinations.
Else	Lets you specify the operation that occurs when the test expression in the IF field is FALSE. This operation executes only if the condition has changed.

Field	Description
	Valid Entries An expression in the following format: command tag **Example** CLOSE DO3 **Note:** You must enter the name of an existing tag. iFIX does not notify you that the specified tag does not exist until the Event Action block goes on scan. If you specify a nonexistent tag, an alarm is sent to all of the node's active alarm destinations.
If Condition 2	Lets you control the execution of the THEN or ELSE operation based upon a test expression on the previous tag. If the previous block satisfies the conditions for a logical TRUE, the THEN operation is executed; otherwise, the ELSE operation is executed. **Note:** The command is latched. This means that the tag remembers the last operation and only performs a new operation if the condition has changed. **Valid Entries** An expression in the following format: Value or Alarm operator condition **Example** Value = 83.2

Field	Description
	Note: You can use either one VALUE or one ALARM in each IF field. When entering your IF statement, leave a space between the VALUE/ALARM, the operator, and the condition entries.
Then	Lets you specify the operation that occurs when the test expression in the IF field is TRUE. This operation executes only if the condition has changed. **Valid Entries** An expression in the following format: command tag **Example** RUN PROG1 **Note:** You must enter the name of an existing tag. iFIX does not notify you that the specified block does not exist until the Event Action block goes on scan. If you specify a nonexistent block, an alarm is sent to all of the node's active alarm destinations.
Else	Lets you specify the operation that occurs when the test expression in the IF field is FALSE. This operation executes only if the condition has changed. **Valid Entries** An expression in the following format: command tag

Field	Description
	Example CLOSE DO3 **Note:** You must enter the name of an existing tag. iFIX does not notify you that the specified tag does not exist until the Event Action block goes on scan. If you specify a nonexistent tag, an alarm is sent to all of the node's active alarm destinations.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.

Field	Description
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value.

Field	Description
	Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the downstream Statistical Control tag. No other tag type is valid.

Field	Description
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

FN Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain spe-

Field	Description
	cial characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag.

Field	Description
	Valid Entries Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.

Field	Description
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Output Areas A, B, C, D	Lets you specify the destinations of the Fanout tag. **Valid Entries** A tag name (F_CV is appended automatically) or specific tag and field name pair in the tag.field format. **Example** To send the Fanout tag's value to a PID tag's set point Value field and to a Ramp tag's Target field, you would type PID1.F_TV1 and RM1.F_TV1 into the Destination fields. **Tip:** A value sent to a secondary tag does not place that tag on scan. Make sure that the target tag's upstream primary tag is on scan.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a

Field	Description
	specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

GAB Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'

Field	Description
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Alarm Tags

Field	Description
Tag 0-15	The tag of another block to monitor for alarms.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources.

Field	Description
	When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you

Field	Description
	want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.

Field	Description
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is re-loaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

GEN Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at

Field	Description
	least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Used to clamp input and to scale output.

Field	Description
High Limit	Used to clamp input and to scale output.
Units	For display purposes.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Wave	Select the desired waveform (SQUARE, SAW, SINE, TRIANGLE).
Period	The length of the full wave form is scan cycles. This also determines the resolution of the wave form. (1 to 1000)
Scale	Percent of the EGU scale used by basic wave form. (0.0 - 100.0) If you set the scale to 50 then the waveform value will range from the 0 to 50% of the EGU span (hi - lo).
Noise	Percent of randomness in output value. (0.0 to 100.0). A random value is generated over the EGU span (hi - lo) and a percentage is added to the out-put. **Note:** If the SCALE and NOISE fields total more than 100% then the output will be clamped to the EGU range. If they total less than

Field	Description
	100% then the range of the output will be less than the EGU Span.
Center Output	If set then the output is centered on the EGU range otherwise it is 0 based. This is only meaningful if the SCALE and NOISE fields do not total 100%.
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a

Field	Description
	specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Process by Exception	Enables exception-based processing for the tag.

Field	Description
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.

HS Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries**

Field	Description
	You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters.

Field	Description
	Example Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag.

Field	Description
	Valid Entries Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.

Field	Description
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Auto Clear Status	Lets you specify when the Histogram tag clears the histogram chart. **Valid Entries** When you enable the check box, the tag clears the display each time the upstream tag goes on scan. If the chain goes off and then back on scan, the histogram chart does not appear until the block generates new values according to the Group field value. When you disable the check box retains old values even if the upstream tag goes off scan. If the chain goes off and then back on scan, old values are displayed. However, this occurs only if the group value was reached.
Interval	Lets you specify the range of values represented by each column in the bar graph. **Valid Entries** A number within the EGU range. **Tip:** Enter the Low and High Limits (EGU) before entering the Interval value. If you enter the Interval value first, the tag automatically readjusts the Interval value when you enter the Low and High Limits.
Group Size	Lets you specify: • How often the Histogram updates the associated chart. The tag calculates the update period by multiplying the Group value by the

Field	Description
	scan time of the chain. For example, if you enter a Group value of 10 and you scan an Analog Input tag every 5 seconds, the histogram updates every 50 seconds. • The number of occurrences displayed on the histogram and the maximum height of the display bars. **Note:** Some input readings may fall outside of the Histogram tag's engineering units range. When this happens, the histogram registers the readings but does not display them. The histogram only displays those incoming values that fall within the specified engineering units range during the specified group limit. **Valid Entries** A time in seconds from 1 to 1000.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area.

Field	Description
	This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

ITM Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'

Field	Description
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Timer and Total Options

Field	Description
Pass	**INP** passes raw input (converted to 0.0 or 1.0), **ALM** passes Current Alarm (converted to 0.0 or 1.0), **INT** passes the most recent interval in seconds (as a FLOAT with milliseconds as a fraction), **TOT** passes current total timer in seconds (as a FLOAT with fraction of 0). Note that the passed values are converted to Float. Also note that some downstream blocks (such as AO) may clamp the passed value to their EGU or OPERATOR limits.
Gate	A TAG:FIELD specifier (normally an F_CV). This gate input is 'anded' with the upstream value and the AUTO status. If blank then the GATE is assumed to be TRUE.
Reset	A TAG:FIELD specifier (normally an F_CV). A transition from 0 to non-zero (e.g. from OPEN to CLOSE) on this optional input will clear the total interval (like writing 0 to the A_TOTAL field). It can optionally clear the current interval and the history based

Field	Description
	on the two check boxes. If the block was previously in alarm as a result of the TOTAL value, the current alarm will return to OK and the latched alarm will remain in place until it is acknowledged. If current interval reset is selected and a current internal is active then it will be reset from its current value back to 0 and will continue to count up from 0.
Reset History	Select this to enable reset history.
Reset Current	Select this to enable reset current.
Range *	A range value which if exceeded for an interval or total will generate a HI alarm. The format is DD:HH:MM:SS.TTT. This will still function if set to zero. To disable, clear the Enable check box for the Alarm Limits (Interval or Total). The alarm occurs as soon as the limit is exceeded. At the start of the next interval the current alarm state will return to normal (although the latched alarm will remain set until it is acknowledged). **Note:** Alarming is only done on the current interval, not on any of the saved intervals. For example if the limit is changed from 50 to 25 and a previous interval had been 35 then no alarm is generated for that stored interval.
Interval Limit	Select to set the INTERVAL LIMIT alarm. Enter the alarm value in the adjoining field.
Total Limit	Select to set the TOTAL LIMIT alarm. Enter the alarm value in the adjoining field.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries**

Field	Description
	INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that

Field	Description
	the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Clear	If Set then the saved intervals and total will be cleared when the chain goes on scan. If not they will retain values when off scan. Also if this is clear then on system startup or database reload the block will retain the values it had the last time the process database was saved to disk by DBB.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Man-

Field	Description
	ager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries**

Field	Description
	Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

LL Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([),

Field	Description
	close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999.

Field	Description
	• Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38.

Field	Description
	• Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is

Field	Description
	used strictly as a display label to identify the engineering units.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example**

Field	Description
	1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values

Field	Description
	that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Scaling Factor	Lets you specify a scaling factor that modifies the lead lag curve. The constant may be applied to the input prior to performing the calculation. **Valid Entries** A value from -100.00 to +100.00. Enter 1 to disable this function.
Lead Time Constant	Lets you specify the lead time constant. **Valid Entries** A value from 0.00 to +100.00 minutes. Enter 0 to disable this function. iFIX accounts for the chain's scan time in the calculation. This scan time controls the size of the offset introduced by a change in the input. The offset is delayed according to the lag constant.
Lag Time Constant	Lets you specify the lag time constant that controls the rate at which the output of the tag approaches the input. A large lag time changes the output very slowly, aside from the lead time, and a small lag time tracks input more closely. **Valid Entries** A value from 0.00 to +100.00 minutes. Enter 0 if you do not want to use any lag time.

Field	Description
	Note: If the Lag time and Lead time are equal, they cancel each other out because the Lead calculation is the inverse of the Lag.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

MDI Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Enable Driver 1-2	Allows you to enable or disable the second or third digital input value. **Note:** If you select the check box(es), enter the driver name, I/O address, and any options for that particular driver in the appropriate fields.
Driver 1-2	Lets you select an I/O driver, OPC UA server, or OPC server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC UA server, or OPC server, you must install it and add it to the available drivers in the SCU.
I/O Address 1-2	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. In an On-Off Control tag, specify the address of the digital point you want opened and

Field	Description
	closed based on the Turn on Above and Turn off Below values. **Valid Entries** Depends on your driver. Consult your I/O driver manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based blocks to occasionally miss a value.
H/W Options 1-2	Lets you select any specific device control addressing format that the tag uses to communicate with process hardware on the plant floor. **Valid Entries** For most process hardware, this field is usually left blank. Consult your I/O driver manual for the applicable hardware code if necessary.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments

Field	Description
	• 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Device States

Field	Description
Alarm 0-7 Enable	Enables or disables alarming for each of the 8 possible raw values. If the tag enters any of the states for which the alarm column is checked, the tag generates a CFN (change from normal) alarm.

Field	Description
	Note: The Multistate Digital Input tag generates alarms only on a transition between alarm status and no alarm status. Transitions between different alarm states do not generate new alarms.
Value 0 (000) Value 1 (001) Value 2 (010) Value 3 (011) Value 4 (100) Value 5 (101) Value 6 (110) Value 7 (111)	Lets you enter a descriptive label for each of the 8 possible raw values. **Valid Entries** Up to 9 alphanumeric characters.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays

Field	Description
	to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Realarm	Enables or disables the re-alarm status of the tag. **Valid Entries** Select the re-alarm check box to generate new alarm messages each time there is a transition between alarm states. Clear this check box if you do not want to generate new alarm messages whenever the alarm state changes.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL

Field	Description
	Note: To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.

Field	Description
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value.

Field	Description
	Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.

Field	Description
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

MDO Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will

Field	Description
	cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Normally Closed	Most contacts are normally OPEN. In this case the normal state is 0 and the normal pattern of a pulse is 0, 1, 0. Setting this flag tells the block to assume this is a normally CLOSED contact. In this case the normal state is 1 and the normal pulse pattern is 1, 0, 1.
Retry Output	If SET then the initial 'CLOSE' output is sent every scan cycle until a confirming CLOSE is read back

Field	Description
	from the device. If clear then the initial CLOSE output is sent only once (this should be sufficient in most applications). In general the system will operate more efficiently if this flag is clear. However if it is possible for the output device to lose synchronization with the PC (e.g. thru a power loss) then you may wish to resend the output every cycle to insure that the system will recover from this situation.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute

Field	Description
	or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Close Tag	Lets you enter a descriptive label for the logical 1 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Close, On.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes.

Field	Description
	Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Duty Cycle	Length of duty cycle in multiples of the SCAN TIME from 0 to 100. This is the minimum time the output will remain closed. For '0' the output will be OPENED as soon as it is detected to be CLOSED. Otherwise the block will delay for 'n' scan cycles before opening the output.
Timeout	This is the maximum number if scan cycles that we will wait for the leading and trailing edge confirms. If the confirm is not received before the timeout expires the request is aborted. The block stays on scan and another request can be attempt-

Field	Description
	ed. Note that if OUTPUT RETRY is set then we will also resend the leading or trailing edge request at each scan cycle if we do not get the confirm.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information.

Field	Description
	Valid Entries Text, up to 80 characters.

ODO Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name:

Field	Description
	~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries**

Field	Description
	Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Field	Description
Invert Output	Inverts the output value so that if the value is 0, it outputs a 1. You can use this option to send a 0 to close a contact and send a 1 to open it.
Time	The duration of the momentary pulse.

Limits and Scaling

Field	Description
Open Tag	Lets you enter a descriptive label for the logical 0 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Open, Off
Close Tag	Lets you enter a descriptive label for the logical 1 value received by the tag. You can display this label in the iFIX WorkSpace through a Data link to aid operators in interpreting the value for the contact. **Valid Entries** A label of up to 16 characters. **Examples** Close, On.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an

Field	Description
	item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL

Field	Description
	Note: To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.

PA Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name:

Field	Description
	~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Input Definitions

Field	Description
Input 1-8 Identifier	Any two-character alphanumeric ID that identifies the corresponding input. Default IDs for input values 1 through 8 are A through H.
Input 1-8 Tag	An input can be any primary or secondary tag that accepts analog values (for example, an Analog Input or Totalizer tag) or an operator entry into this field. To configure the Pareto tag to accept values from another tag, enter the tag and field name pair in the input column (for example, AI1.F_CV). If the input goes off scan, the Pareto block treats the input's value as zero.

Field	Description
	You can also configure the Pareto block to use a numeric constant that is greater than or equal to zero. The Pareto block treats negative numbers as zero.
Input 1-8 Descriptor	Up to 30 alphanumeric characters for each Pareto block input.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries**

Field	Description
	Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage.

Field	Description
	Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Display Format	Lets you specify the number of decimal digits that appear to the right of the decimal point in operator displays.

Field	Description
	Valid Entries Any number from 0 to 6 digits of precision. **Note:** In the iFIX WorkSpace, the Display field can contain a total of 15 characters, consisting of numbers to the left and right of the decimal point .
Sort Order	Lets you specify the order in which the input values appear in operator displays. An operator can change the sort order through a Data link that displays the A_SORT field. **Valid Entries** Descending, Ascending, or No Sorting. By default, the sort order is Descending. Database Manager sorts the data as follows: • 1 Special characters (such as punctuation marks) by ASCII value. • 2 Numbers by numeric value. • 3 Letters in alphabetic order.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the downstream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Imple-

Field	Description
	menting Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag.

Field	Description
	When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is re-loaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

PAR Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal

Field	Description
	databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the block's minimum value.

Field	Description
	Valid Entries You can enter a low limit in one of three formats: • Standard Integer. Standard integers range from -32768 to 32767 (signed integers); 0 to 65535 (unsigned integers); 0 to 999 (3BCD); or 0 to 4095 (12 Binary). • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. **Note:** If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the block's maximum value. **Valid Entries** You can enter a low limit in one of three formats: • Standard Integer. Standard integers range from -32768 to 32767 (signed integers); 0 to 65535 (unsigned integers); 0 to 999 (3BCD); or 0 to 4095 (12 Binary). • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. **Note:** If you are using scientific notation, up to six decimal places may be configured with

Field	Description
	precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter; liters per minute; degrees Celsius. **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.

Array Values

Field	Description
Value 01-60	Lets you read values from or write values to each of the 60 fields. **Valid Entries** You can enter a value in one of three formats: Stan • dard Integer. Standard integers range from -32768 to 32767 (signed integers); 0 to 65535 (unsigned integers); 0 to 999 (3BCD); or 0 to 4095 (12 Binary).

Field	Description
	• Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. **Note:** If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Text 01-60	Lets you read descriptions from or write descriptions to each of the 60 fields. **Valid Entries** Up to 40 characters.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Man-

Field	Description
	ager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries**

Field	Description
	Text, up to 80 characters.

PG Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @

Field	Description
	Examples AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Programming Statements

Field	Description
PGM Statement 0 -19	Lets you enter the commands and arguments for the Program tag. Use the Browse (...) button to select from a list of valid commands. **Valid Entries** The list box can include up to 20 programming statements, each containing up to 44 alphanumeric characters in length.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with

Field	Description
	the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL

Field	Description
	Note: To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.

Field	Description
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value.

Field	Description
	Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag.

Field	Description
	Valid Entries None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags chained to it. **Valid Entries**

Field	Description
	• 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

PI2 Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Used to clamp PV, SP and internal calculations(unless NO CLAMP is set). Should match the output EGU of the upstream block. NOTE: inverted EGU range is not supported by the PI2 block. The HI egu must be larger than the LO egu.
High Limit	Used to clamp PV, SP and internal calculations (unless NO CLAMP is set). Should match the output EGU of the upstream block. NOTE: inverted EGU range is not supported by the PI2 block. The HI egu must be larger than the LO egu.
Units	For display purposes.
Low Output Limit	Used to rescale and clamp the computed value for output. Inverted EGU range is not allowed; HI must be larger than LO.
High Output Limit	Used to rescale and clamp the computed value for output. Inverted EGU range is not allowed; HI must be larger than LO.
Output EGU Tag	For display purposes.

Tuning Constants and Algorithm

Field	Description
Proportional Band	The proportional band tuning constant from 0 to 10,000.
Integral Time	Minutes per repeat - the Integral tuning constant from 0 to 99. Entering 0 disables reset (integral).
Rate Limit	In minutes - the Derivative tuning constant from 0 to 20. Entering 0 disables rate (derivative).
Gap Action	Suppresses control action if the error is less than this limit. That is, the output remains constant if the error drops below the GAP limit. This is can be used to suppress valve chatter. The default is 0.0.
Derivative Filter	If enabled, a first order filter is applied to the derivative term to limit response to high frequency noise. The derivative filter is suppressed if the RATE is less than 10 * the block scan time.

Setpoint Limits and Options

Field	Description
Low Setpoint Clamp	Values outside the limits entered by the operator or sent by other blocks, other applications or CDA programs will be rejected and an error will be returned. Remote setpoints outside this range will be accepted but will be clamped to these limits. Note there is no visible indication that clamping of a remote SP has occurred.
High Setpoint Clamp	Values outside the limits entered by the operator or sent by other blocks, other applications or CDA programs will be rejected and an error will be returned. Remote setpoints outside this range will be accepted but will be clamped to these limits. Note there is no visible indication that clamping of a remote SP has occurred.

Field	Description
Setpoint Tag	The value of the remote block.
Balance	If enabled, then SP is set to PV on any MANL to AUTO transition. This has no effect on remote set-points.
Direct Action	If enabled then the Proportional band is multiplied by -1.
Force Remote	If enabled then a MANL to AUTO transition will also force the Setpoint from Local to Remote (if a remote SP is used).

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.

Field	Description
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.
Alarm in Manual	If enabled, then the deviation alarm is checked when the block is in MANL as well as when it is in AUTO.
Dead Band	Once a deviation alarm is generated the difference must drop to the DEVIATION LIMIT - DEADBAND for the alarm to clear.
Deviation Value	If the difference between SP and PV exceeds this limit a DEV alarm is generated. Entering 0.0 disables alarming.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes.

Field	Description
	Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Feedback Tag	Can be the tag of another block (typically an Analog Input) which directly reads back the value of the actuator. If present, the feedback value will override the internally saved previous output. The next output will be the sum of the P, I and D terms added to the feedback rather than added to the previous output.
Reverse Output	If enabled the output is inverted just before being passed downstream. A computed output of 100% is passed downstream as 0 and an output of 0% is passed downstream as 100. Note that the selection of this field does not affect the display or entry of the output. Example: enable output reverse. Enter a manual output of 25. Any read of the output by any application will return 25. However a downstream block such as AO or TR will see a value of 75.
No Initial Clamp	Indicates if the blocks internal calculations should be clamped at the hi/lo egu range. If clamp is disabled then the 'previous' output is allowed to fall

Field	Description
	below the lo limit. This can be useful in proportional only control.
Clear Output	Indicates if the OUTPUT should be cleared when the chain is placed ON SCAN.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

PID Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries**

Field	Description
	You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
EGU Tag	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters.

Field	Description
	Example Kilograms per square meter, Liters per minute, degrees Celsius. **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Low Output Limit	Displays the low limit for the output of the PID block. **Valid Entries** The lowest value the controlled variable (the Analog Output or another PID block) can have should be specified in the Low Limit field. This entry can be different from the PID block's Low Limit. In addition, your I/O driver, OPC UA server, or OPC server can impose certain limitations on the engineering units range. If necessary, consult your I/O driver, OPC UA server, or OPC server manual for more information.
High Output Limit	Displays the high limit for the output of the PID block. **Valid Entries** The highest value the controlled variable (the Analog Output or another PID block) can have should be specified in the High Limit field. This entry can be different from the PID block's High Limit. In addition, your I/O driver, OPC UA server, or OPC server can impose certain limita-

Field	Description
	tions on the engineering units range. If necessary, consult your I/O driver, OPC UA server, or OPC server manual for more information.
Output EGU Tag	Enter a label for the limits in the Units field, such as PCT or DEG.

Tuning Constants and Algorithms

Field	Description
Proportional band	Lets you enter a tuning constant, equal to the inverse of the proportional gain multiplied by 100%. **Valid Entries** A value from 1.00 to 10,000.00 percent. This value is the range of input deviation that drives the controller's output through its full range. The change in controller output is inversely proportional to the proportional band.
Integral Time	Lets you enter an integral time constant. **Valid Entries** A value from 0.000 to 99.000 minutes per repeat. For large capacity control systems, the reset tuning parameter provides a temporary change in the PID output, even if the deviation is small and the rate of deviation is fast. When the rate of change measurement becomes steady, the Reset is adjusted internally to zero (0) in the PID algorithm. Decreasing the reset time tends to minimize overshoot of the set point, but it will then take longer to reach the set point.

Field	Description
	Note: If you apply a reset tuning parameter to a small-capacity process loop, oscillations in the PID output could develop, causing damage to process control equipment.
Derivative Time	Lets you enter a derivative time constant measured in minutes per repeat. **Valid Entries** A value from 0 to 20 minutes. Enter values smaller than a minute in decimals. **Example** Enter a value of .25 (of a minute) to represent a rate of 15 seconds. The tag automatically adjusts internally to account for the scan cycle of the loop. **Tip:** The rate value provides a backwards push to rapidly changing controller output. Usually this value is between 0 and 1. This can help minimize overshoot and stabilize the loop. Higher values can result in loop instability.
Alpha-rate Factor	Lets you specify a derivative mode filter for algorithm tuning. This value specifies the amount of derivative filtering that is applied to the algorithm. The Alpha value performs a filtering of the derivative portion of the output signal and is a first order lag term. **Valid Entries**

Field	Description
	A value in the range of 0.0 to 0.125. The default value of 0.0 disables this function.
Beta-rate Factor	Lets you specify a proportional action constant for algorithm tuning. This value serves as a multiplier for the proportional term. **Valid Entries** A value in the range of 0.0 to 1.0. The default value of 1.0 provides normal proportional action. A value of 0.0 disables the function.
Gamma-reset Factor	Lets you specify a derivative action constant for algorithm tuning. This value specifies the action of the derivative component of the algorithm. Therefore, a value in this field can limit the amount of derivative action performed in the algorithm. **Valid Entries** A value in the range of 0.0 to 1.0. The default value of 1.0 provides normal derivative action. A value of 0.0 disables the function.

Setpoint Limits and Options

Field	Description
Dead band value	Lets you enter the maximum fluctuation the tag accepts without re-issuing an alarm. As long as the fluctuation is within the dead band range, the tag issues an alarm once, eliminating nuisance alarms. Once the alarm falls below the dead band and then exceeds the alarm limits, the tag generates another alarm. **Valid Entries** Numeric value within the EGU range.

Field	Description
	Example If the High alarm limit is 80 and the dead band is 5, the tag does not re-issue an alarm after the one while the current value fluctuates between 75 and 85.
Deviation value	Generates an alarm if the difference between the set point value and the measured value (Analog Input tag) is greater than the entry in this field. The deviation is the difference between the set point value and the process variable: DEVIATION = SET POINT VALUE - PROCESS VARIABLE **Valid Entries** The appropriate value, in engineering units. Use 0 to disable the deviation alarm.
Gap Action	Compensates for controller error by providing a dead band in updates to the PID algorithm. The Gap Action value prevents the PID tag from sending out adjustments to the process if the deviation from the set point value is within this dead band. **Valid Entries** Enter a value that represents the dead band range. If the change is within this range, the deviation is set to 0 (zero).
Low Setpoint Clamp	Lets you specify the lowest acceptable value for the PID set point. Any changes to the set point must fall within the Low and High Clamp values. This limit applies to set points derived from cascades, ramps, and other control loop strategies in addition to the set point values entered by an operator.

Field	Description
	Valid Entries The minimum value for the set point.
High Setpoint Clamp	Lets you specify the highest acceptable value for the PID set point. Any changes to the set point must fall within the High and Low Clamp values. This limit applies to set points derived from cascades, ramps, and other control loop strategies in addition to the set point values entered by an operator. **Valid Entries** The maximum value for the set point.
Setpoint Tag	Lets you specify the desired value of a controlled variable. **Valid Entries** Blank (to let operators type a fixed value from a Data link, this set point is a local set point.) or an Analog Input tag, in the tag.field format. (F_CV). By controlling the set point from an Analog Input tag, the PID block retrieves the current value through the Scan, Alarm, and Control (SAC) program. This set point is called a remote set point. When the set point is displayed through a Data link (using the TV1 field), it appears with either an L or an R to the right of the set point value to indicate a local or remote set point. In addition, the entry in the set point value field is in effect any time the database is saved and reloaded, even if an operator has manually changed the value.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.

Field	Description
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.

Field	Description
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver.

Field	Description
	After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.

Field	Description
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Reverse Output	Inverts the output of the tag.
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Transfer Status	Lets you control how the PID tag reacts during a transition between automatic and manual modes. **Valid Entries**

Field	Description
	• Track – Tracks the position of the output when the tag is in Manual mode. When there is a transition back to Automatic mode, the PID tag calculates the output using the current and previous error terms. • Balance – Enables the Scan, Alarm, and Control (SAC) program to provide a bumpless transfer when the PID tag changes from Manual to Automatic mode. Error is removed from the process by balancing the set point to make it equal to the process measurement. • None – Disables the transfer options and is the default selection.
Feedback Tag	Lets you control how the PID tag reacts during a transition between automatic and manual modes. **Valid Entries** • Track – Tracks the position of the output when the tag is in Manual mode. When there is a transition back to Automatic mode, the PID tag calculates the output using the current and previous error terms. • Balance – Enables the Scan, Alarm, and Control (SAC) program to provide a bumpless transfer when the PID tag changes from Manual to Automatic mode. Error is removed from the process by balancing the set point to make it equal to the process measurement. • None – Disables the transfer options and is the default selection.
Derivative Time	

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the downstream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Imple-

Field	Description
	menting Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

RB Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names.

Field	Description
	Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries**

Field	Description
	• Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (un-signed integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more informa-tion. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more deci-mal places in the Low Limit field. If you are using scientific notation, up to six deci-mal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999.

Field	Description
	• Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius,

Field	Description
	Note: This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Ratio Value	Multiplies the value from the upstream block by a constant. **Valid Entries** The constant by which you want to multiply the incoming signal. The default value is 1.
Bias Value	Lets you specify the bias constant for the ratio bias equation. The bias allows the value to be adjusted by up to +/- half the engineering units span. **Valid Entries** A numeric constant or a tag and field name pair in the format tag.field that represents the value you want to add to the incoming signal. **Note:** The range of the bias constant is a function of the engineering units range. Therefore, if you want the bias to use the same EGU range as the incoming signal, enter the EGU range of the upstream block into the Ratios Bias's EGU fields.
Offest Value	Lets you specify the value you want to subtract from the upstream tag's incoming signal. **Valid Entries**

Field	Description
	A numeric constant or a tag and field name pair in the format tag.field.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector.

Field	Description
	Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.

Field	Description
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less.

Field	Description
	Valid Entries Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Field	Description
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries**

Field	Description
	None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

RM Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag

Field	Description
	clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150.

Field	Description
	If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Low Operator Limit	Lets you specify the lowest operational target value accepted from a SETTARG command in a Program tag or from an operator entry into a Data link. **Valid Entries** A value between the Low and High EGU fields. If appropriate, you can use the Low EGU for this value.
High Operator Limit	Lets you specify the highest operational target value accepted from a SETTARG command in a Program tag or from an operator entry into a Data link.

Field	Description
	Valid Entries A value between the Low and High EGU fields. If appropriate, you can use the High EGU for this value.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in min-

Field	Description
	utes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Ramp Definitions

Field	Description
Target Value 1	Lets you specify the value you want the tag to reach. **Valid Entries** A value or a tag and field name (uses the current value of another block). **Note:** You can use a Program tag to set the target values of a Ramp tag. SETTARG sets the value of the first target value, SETTARG2 sets the value of the second target value, and SETTARG3 sets the value of the third target value. If a target value that is outside the Ramp tag's EGU range, iFIX clamps the value to the block's Low and High Operator Limits.
Ramp Rate 1	Lets you specify the increments at which the current value is modified until reaching the target value for each stage. **Valid Entries** A value based on hours. Use 0.00 to prevent the execution of the ramp stage. **Example**

Field	Description
	To use a rate of 1 degree per second, enter 3600, for 3600 degrees per hour. The precision, or number of decimal points, of the ramp rate is the same as the Low and High EGU range.
Hold Time 1	Lets you specify how long the Ramp tag waits after reaching the target value and before continuing on to the next stage. **Valid Entries** A value based on hours. The default hold time is 0.000. The maximum hold time is 1000 hours. **Example** To hold for one hour, enter 1.000. **Note:** You can use a Program tag to set the hold time of a Ramp block. SETTIME sets the ramp time for the first stage and SETTIME2 sets the ramp time for the second stage.
Target Value 2	Lets you specify the value you want the tag to reach. **Valid Entries** A value or a tag and field name (uses the current value of another block). **Note:** You can use a Program tag to set the target values of a Ramp tag. SETTARG sets the value of the first target value, SETTARG2 sets the value of the second target value, and SETTARG3 sets the value of

Field	Description
	the third target value. If a target value that is outside the Ramp tag's EGU range, iFIX clamps the value to the block's Low and High Operator Limits.
Ramp Rate 2	Lets you specify the increments at which the current value is modified until reaching the target value for each stage. **Valid Entries** A value based on hours. Use 0.00 to prevent the execution of the ramp stage. **Example** To use a rate of 1 degree per second, enter 3600, for 3600 degrees per hour. The precision, or number of decimal points, of the ramp rate is the same as the Low and High EGU range.
Hold Time 2	Lets you specify how long the Ramp tag waits after reaching the target value and before continuing on to the next stage. **Valid Entries** A value based on hours. The default hold time is 0.000. The maximum hold time is 1000 hours. **Example** To hold for one hour, enter 1.000. **Note:** You can use a Program tag to set the hold time of a Ramp block. SETTIME sets the ramp time for the first stage and SET-

Field	Description
	TIME2 sets the ramp time for the second stage.
Target Value 3	Lets you specify the value you want the tag to reach. **Valid Entries** A value or a block and field name (uses the current value of another tag). **Note:** You can use a Program tag to set the target values of a Ramp tag. SETTARG sets the value of the first target value, SETTARG2 sets the value of the second target value, and SETTARG3 sets the value of the third target value. If a target value that is outside the Ramp tag's EGU range, iFIX clamps the value to the block's Low and High Operator Limits.
Ramp Rate 3	Lets you specify the increments at which the current value is modified until reaching the target value for each stage. **Valid Entries** A value based on hours. Use 0.00 to prevent the execution of the ramp stage. **Example** To use a rate of 1 degree per second, enter 3600, for 3600 degrees per hour. The precision, or number of decimal points, of the ramp rate is the same as the Low and High EGU range.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag.

Field	Description
	Valid Entries Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.

Field	Description
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button.

Field	Description
	Note: In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

SC Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs.

Field	Description
	Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.

Field	Description
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

SC Specifics and Constants

Field	Description
Add to Block	Lets you pass the adjustment value of the Statistical Control block to the specified tag. The tag can add this adjustment to: • The current value of the Analog Output block. • The target value of the PID block. • The target value of the Ramp block. **Valid Entries** The tag and field name pair in tag.field format.
Recalculate Status	Re-computes the upstream Statistical Data tag's upper and lower control limits after adjusting a value and the delay time expires. **Valid Entries** Select the check box to recalculate the limits. Clear the check box to maintain previously set control limits.
Alarm Suppression	Suppresses the generation of alarms until the Statistical Data tag processes a new set of groups. **Valid Entries** Select the check box to suppress alarms. Clear the check box to generate alarms.

Field	Description
Track Messages	Sends a message to the Statistical Control block's active alarm destinations each time the tag adjusts a value. **Valid Entries** Select the check box to send messages. Clear the check box to suppress messages.
Show Calc Adjustment	Lets you display the latest calculated adjustment in the iFIX WorkSpace. **Valid Entries** Select the check box to display the adjustment through a Data link, using block.A_CV as the entry. Clear the check box to prevent this display. **Note:** Enabling the Show Calculation option allows you to display the calculated adjustments in a picture. You can use these values to adjust your tuning constants more precisely. If you want to see only the values the block sends to its downstream block, use A_SENT in the Data link.
Slope Constant	Multiplies the slope of the plotted XBAR values found in the upstream Statistical Data tag by the specified value. The slope constant is a floating-point scaling factor. **Valid Entries** A value between -99,999.0 and 900,000.0
Deviation Constant	Multiplies the average deviation of XBAR values from XBARBAR by the specified value. The deviation constant is a floating-point scaling factor.

Field	Description
	Valid Entries The appropriate floating point value.
Delay Time	Lets you specify the length of time the Statistical Control tag remains dormant. This period lets the process settle after receiving the adjusted value. During this time, the Scan, Alarm, and Control (SAC) program suppresses alarms in the upstream Statistical Data tag and the Statistical Control tag makes no further adjustments. **Valid Entries** A time in seconds between 1 and 32767. **Tip:** Allow time for the upstream block to read at least one full set of data groups.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag.

Field	Description
	Note: The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries**

Field	Description
	Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage.

Field	Description
	Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual

Field	Description
	mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries**

Field	Description
	Text, up to 80 characters.

SD Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @

Field	Description
	Examples AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Scaling

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary).

Field	Description
	Note: The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult

Field	Description
	your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Scan Qualifier	Lets you specify a digital tag that controls when the Statistical Data block samples the block specified in the Input Tag field. When the digital tag transitions from open to closed, the Statistical Data tag samples the input tag.

Field	Description
	Valid Entries The name of a block with an F_CV field that returns a 1 or 0.
Input Score	Lets you specify the input source of the Statistical Data tag. **Valid Entries** • The name of an Analog Alarm, Analog Input, Analog Output, or Calculation tag. • Blank, to indicate input from an operator or from an Easy Database Access program.
Groups	Lets you specify the input source of the Statistical Data tag. **Valid Entries** The name of an Analog Alarm, Analog Input, Analog Output, or Calculation tag. Blank, to indicate input from an operator or from an Easy Database Access program.
Observations/group	Lets you specify the number of observations that the Statistical Data tag makes per group. **Valid Entries** A value from 1 to 25. **Note:** You can change the Observations/Group field with a Data link in the iFIX WorkSpace. After making your changes, turn the Statistical Data tag off scan and then back on scan to restart it with the new values.

Field	Description
Wait time	Lets you specify the time, in seconds, that the Statistical Data tag pauses between the last observation of one group and the first observation of the next group. **Valid Entries** A value from 0 to 32767 seconds. **Note:** The wait time is valid only when the tag is in Automatic mode.
CTL limit calc mode	Lets you specify the calculation mode of control, warning, and specification limits for XBAR, S, and R charts. **Valid Entries** • Startup – Instructs the tag not to recalculate limits for XBAR, R, and S charts after startup. This option is the default selection. Operators can change these limits through Data links in the WorkSpace at any time. • Always – Lets the tag update values for the limits on a moving average basis. The block overwrites operator entries as soon as the group is updated. • Never – Lets the tag calculate limits for XBAR, R, and S charts based upon defaults. Operators can enter values at any time before or after startup. The block does not overwrite these values. **Note:** If you choose to manually input limit values, verify that the values are very close to

Field	Description
	the ones the block would calculate. Otherwise, the validity of statistical alarms and control charts is questionable.
XBB calc mode	Specifies the calculation mode of XBARBAR, SBAR, and RBAR values. **Valid Entries** • Startup – Instructs the tag not to recalculate alarm limits, XBARBAR, RBAR, and SBAR values after startup. This option is the default selection. Operators can change these limits with Data links in the WorkSpace at any time. • Always – Lets the tag update values for alarm limits on a moving average basis. The tag overwrites operator entries as soon as the group is updated. • Never – Lets the tag calculate alarm limits, XBAR, R and S values based upon defaults. Operators can enter values at any time before or after startup. The tag does not overwrite these values. **Note:** If you choose to manually input limit values, verify that the values are very close to the ones the block would calculate. Otherwise, the validity of statistical alarms and control charts is questionable.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it.

Field	Description
	Valid Entries • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries**

Field	Description
	INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.
N point control limit alarm on XBAR	Generates an alarm when the XBAR value of the specified number of groups is outside the control limits (+ 3 sigma).
Number of groups for control limit alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.
N point warning limit alarm on XBAR	Generates an alarm when the XBAR values of the specified number of consecutive groups are outside the control warning limits (control warning limit is 2/3 of the upper or lower control limit values, which is + 2 sigma.)
Number of groups for warning limit alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.
N point specification limit on XBAR	Generates an alarm if the specified number of groups are outside the range of the control limits. Generates an alarm if the specified number of groups are outside the range of the control limits.

Field	Description
Number of groups for the specification limit alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.
N point Alarm on RBAR	Generates an alarm when the range of the specified number of groups is outside the standard deviation control limits.
Number of groups for the RBAR alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.
N point Alarm on SBAR	Generates an alarm when the specified number of groups is outside the standard deviation control limits.
Number of groups for the SBAR alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.
Trend of runs alarm	Generates an alarm when the specified number of groups is outside the standard deviation control limits.
Number of groups for the Trend alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.
Lenth of runs alarm	Generates an alarm if the specified number of consecutive groups are above or below XBARBAR.
Number of groups for the Length Alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.
N Point Critical Runs on XBAR	Generates an alarm if the Statistical Data Block observes less than the specified number of crossings of the mean by serial observations.
Number of groups for critical runs alarm	Enter the appropriate number of groups in the On Groups column so the tag can send alarms to its alarm areas.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes.

Field	Description
	If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.

Field	Description
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if

Field	Description
	this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts

Field	Description
	or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

SQD Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Data Definitions

Field	Description
Tag 1 - 20	Enter up to 20 tag and field name pairs that store data from your relational database or from the iFIX process database. Depending on the Tag.Field direction (In or Out), the SQL system task either reads the value of the tag and field and writes it to a relational database, or reads a selected value from the relational database and writes to it to the specified tag and field. The field entry can be any ASCII (A_) or floating point (F_) field available to the tag. In addition, you can also use SQL keywords.
Direction 1 - 20	Determines the data transfer direction between the process database and the relational database for up to 20 tag and field name pairs. Valid entries are: • A SQL keyword, In (to receive data from the relational database), or Out (to send data to the relational database) • A single SQL command can use both directions. **Note:** Most SQL commands delete, select, update, or insert values in a relational database. When selecting values from a relational database, the tag sets the value of each data point's Direction field to In. When inserting or updating rows, or in a SELECT command with a "where" clause, the tag sends process data values to the relational database. In these cases, the tag

Field	Description
	sets the value of each data point's Direction field to Out.
Reset Status Tag 1 - 20	Allows you to clear numeric or text data in the process database each time the SQL Trigger and Data tag chain executes. This field provides better control over monitoring the actual data retrieved by the SQL Data tag each time the SQL Trigger tag executes. Valid entries are: • None – Prevents the tag from resetting the field. • Blank – Removes any text data in the field. This setting is commonly used when you are retrieving text from tag Description fields. • Zero – Writes a numeric zero to the specified tag and field.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.

Field	Description
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.

Field	Description
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver.

Field	Description
	After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.

Field	Description
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default.

Field	Description
	Note: Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information.

Field	Description
	Valid Entries Text, up to 80 characters.

SQT Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name:

Field	Description
	~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

SQL Definitions and Date Filters

Field	Description
SQL Command Name	Lets you specify the SQL command alias that SQL System Task uses when the SQL Trigger tag runs. SQL commands are stored in an SQL Library Table. Each row in the table consists of a SQL command and an alias. If the Database ID field is specified, that database ID will be used to seek the SQL LIB and SQL name for the SQL command, and the Database ID configured inside this block will only be used for the DATA portion of the SQL database and not for the SQL LIB portion. **Valid Entries** An alias up to eight characters. Lowercase letters are automatically capitalized.

Field	Description
Database ID	Lets you specify the relational database (data source) to use for the current block. If you specify a Database ID here, it will be used to seek the SQL LIB and SQL name for the SQL command, and override the block configuration related to the location of the SQL LIB.
Event Start Date	Lets you specify when the SQL Trigger tag executes. **Valid Entries** • 1-31 – Specifies a day of the month to trigger the tag. • Sun, Mon, Tue, Wed, Thu, Fri, Sat – Specifies a day of the week to trigger the tag. • All – Runs the block based upon the Event Time or Event Tag fields. • None – Disables all time and tag based events. **Note:** If the start date is later than the end date, the block runs through the end of the week or month and into the next week or month. When you specify All or None for the Start Date, the End Date should always be None.
Event End Date	Lets you specify when the SQL Trigger tag stops. Use the following guidelines when defining the End Date:

Field	Description
	• If the start date is later than the end date, the tag runs through the end of the week or month and into the next week or month. • If you do not define an end time or period, the tag executes once on the start time. • If you do not define the end time, but you define a period, the tag uses an implied end time of 24:00:00 (midnight). **Valid Entries** • 1-31 – Specifies a day of the month the tag stops. • Sun, Mon, Tue, Wed, Thu, Fri, Sat – Specifies a day of the week the tag stops. • None – Specifies the tag stops on the same day or date it started on.
Process By Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute

Field	Description
	or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Time and Block Events

Field	Description
Event Start Time	Lets you specify a time between 00:00:00 to 23:59:59 to indicate the time that the SQL Trigger tag executes. Use the following guidelines when defining the Start Time field: • If you leave the Start Time field blank, the SQL Trigger block does not run based on time. • If you specify a start time without an end time, the block triggers once at the specified time on every day within the date range specified in the Start Date and End Date fields. • If you define a start and end time and do not define an Event Period, the block triggers based on its scan time.
Event End Time	Lets you specify a time between 00:00:00 and 23:59:59 to indicate the time that the SQL Trigger tag stops. Use the following guidelines when defining the Start Time field:

Field	Description
	• If you do not enter an end time, the tag automatically stops at midnight. • If you define the Start Time and Event Period but not the End Time, then the tag executes once every day within the date range of Start Date and End Date fields. The tag assumes the End Time is the end of the day.
Event Period	Lets you specify a time between 00:00:00 and 23:59:59 to indicate how often the SQL Trigger tag triggers after reaching the start time. Use the following guidelines when defining the period: • If you enter a time less than the tag's scan time, the tag triggers every time it is scanned; otherwise, the tag triggers according to the period time. • If you enter start and end times, the tag triggers at the start time and every event period after that until reaching the end time. Then, the tag stops until reaching the start time again, provided the day or date is still within the range specified in the Start Date and End Date fields. • Once a period starts, it always finishes even if it spills over into a day that is not within the range specified in the Start Date and End Date fields.
Event Tag	Lets you specify the tag and field name pair that activates the SQL Trigger tag. You can configure the tag to trigger when the value of the specified event tag changes from zero to a non-zero value, from a non-zero value to zero, or simply changes value. **Valid Entries**

Field	Description
	• If you specify an ASCII field (A_), you can only trigger the tag by a Change Of Value event type. • If you specify a floating point field (F_), you can trigger the tag by either a Change Of Value, High to Low, or Low To High event type. Low is defined as 0 and a High is defined as non-zero, so you can use an analog tag. • To trigger a tag by an event tag and type, the current day or date must be within the date range specified by the Start and End Date fields.
Confirmation Tag	Lets you enter an analog or digital tag (where low is 0 and high is non-zero) to allow your process hardware to confirm the execution of the SQL Trigger tag. The process hardware does this by examining the value of the tag and field entered into this field. When the value is non-zero, the process hardware assumes the execution is complete. In addition, you can use this field in conjunction with the Event Tag and Event Type fields to establish synchronization between the device and the SQL Trigger tag. **Important:** This field requires a floating point (F_) field. Furthermore, the tag only uses the specified tag when the Low to High or High to Low Event Type is selected. **Example** Assume your process hardware sets a value, holds all values for the process database, and then waits for the Confirm Tag's value to change. By setting

Field	Description
	a value, the process hardware triggers the SQL Trigger tag. This causes the SQL System task to process the downstream SQL Data blocks and write a non-zero value in the Confirm Tag. In response, the process hardware clears the value it set and resumes processing. If you do not have your hardware configured to reset the Confirmation tag, it will reset to 0 anyway when the EVENT tag triggers the SQT to set it back to the default position.
Event Type	Lets you specify the type of event that starts the SQL Trigger tag in conjunction with the Event Tag field. Select one of the following options: • Change of Value – Starts the tag when the value of the Event Tag field changes. To use this event type, enter any ASCII (A_) or floating point (F_) field as the Event Tag. For example, A_CUALM. • Low to High – Starts the tag any time value of the Event Tag field changes from zero to non-zero. To use this event type, enter a floating point field (F_) as the Event Tag. For example: F_CV. • High to Low – Starts the tag any time the value of the Event Tag field changes from non-zero to zero. To use this event type, enter a floating point field (F_) as the Event Tag. For example, F_CV.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an

Field	Description
	item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL

Field	Description
	Note: To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.

Field	Description
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value.

Field	Description
	Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
	• Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag.

Field	Description
	Valid Entries None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Table Mode	Lets you specify the SELECT mode of the SQL Data tag. Select one of the following options:

Field	Description
	• Single Row – The SQL Data block accepts one row from a SELECT command. • Multiple Rows – The SQL Data block accepts more than one row from a SELECT command and write values to individual blocks. • Array Mode – The SQL Data block accepts more than one row from a SELECT command and write values to register blocks. Be sure you specify a register block for each column returned from the SELECT command.
Command Type	Choose one of the following: • SQL Command – Lets you select a SQL command as the command type. Once selected, enter the name of the SQL command in the SQL Name field on the Basic tab. • Procedure – Lets you select a SQL command as the command type. Once selected, enter the name of the SQL command in the SQL Name field on the Basic tab.
Backup Data	Lets you enable the SQL Trigger tag to back up process data if it detects a problem with the relational database. **Note:** The SQL software option does not back up a SELECT command's request because there is no means of accurately determining when the connection to the server can be re-established. Since the SELECT command inserts values into the process database, the process of inserting must be performed on a controlled and predictable ba-

Field	Description
	sis, not whenever the connection is re-established.
Rows	Lets you specify the starting row, depending on the Select Parameters mode: • Single Row – Enter the starting row of the resulting data if multiple rows are returned. • Multiple Rows – Enter the starting row of the resulting data. • Array Mode – Enter the number of rows returned.
Cols	Lets you specify the number of columns configured in the SELECT command.

SS Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal

Field	Description
	databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or serv-

Field	Description
	er enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations. **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value. **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range.

Field	Description
	Note: Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries** • 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments

Field	Description
	• 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Limits and Inputs

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999.

Field	Description
	• Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the tag clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38.

Field	Description
	• Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the tag is 150 and the High Limit is 100, the tag clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150. If you want to display a value of 1.236 from the Calculation tag, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is

Field	Description
	used strictly as a display label to identify the engineering units.
Scale Enabled	Lets you enable or disable scaling for this tag. Enabling scaling allows the system to convert the data received from input sensors to designated data ranges. **Note:** Linear scaling and signal conditioning cannot be applied simultaneously. If you select Linear Scaling, verify that Signal Conditioning is set to NONE. **Example** Scaling allows conversion of temperature data received in Fahrenheit to an output which uses Celsius values.
Input 1-6	Lets you specify where the Signal Select tag receives input data. You can specify any EGU range for the Signal Select tag's inputs. However, if the value of an input is outside the specified EGU range, the tag clamps it to the highest or lowest acceptable value. **Valid Entries** A tag and field name pair in the format tag.field or a numeric constant. Named blocks must exist in the same database as your Signal Select tag. An input entry may also include zero (0). If you select Low in the Selected Mode field, the Signal Select tag processes a zero entry if that entry is the lowest value entered in all Input fields.

Field	Description
	Note: Input 1 is always the upstream tag, tied to the Signal Select tag through the upstream block's Next Block field.
Selection Mode	Lets you specify how the Signal Select tag uses its input values to calculate its output value. You can change the selected mode field with a modifiable Data link in the iFIX WorkSpace, a SETSEL command from a Program block, or an Easy Database Access program. Select one of the following options: • Inputs 1-6 – Outputs the corresponding input number. • Average – Outputs the average of all the assigned inputs. • Good – Outputs the first good input. A good value is one that is within the tag's EGU range. • High – Outputs the highest input. • Low – Outputs the lowest input. • Sum – Outputs the sum of all the inputs. **Notes** • An Input number, for example, Input 5, is usually specified when you are loading recipes and want the value from a particular input passed to the next tag when a recipe loads. • If one or more of the inputs are bad or off scan and the selected mode is Average or

Field	Description
	Sum, the Signal Select tag ignores these inputs and continues with the calculation based on the remaining ones.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example**

Field	Description
	1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values

Field	Description
	that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

TDS Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Advanced Options

Field	Description
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Mode	Trigger on OPEN, CLOSE or COS. **Note:** The 0 is treated as OPEN and any non-zero value is treated as CLOSE. For example a change from 0 to any other value will trigger on CLOSE. A change from any non-zero value to 0 will trigger on OPEN and a change bewteen 0 and any non-zero value will trigger on COS. A change between two non-zero values will not trigger COS. As mentioned elsewhere this block is generally used with Digital Inputs.
Format	Allows a variety of date formats to allow for different country and/or relational database needs.
Separator	Allows a variety of date separators to allow for different country and/or relational database needs.

TM Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'

Field	Description
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Timer and Setup Options

Field	Description
Timing Direction	Lets you increment or decrement the Timer tag value. Up is the default direction.
Target Value	Lets you specify the value that triggers the following events when alarms are enabled: • Generates an alarm. • Closes the specified digital block, if the Alarm Tag field contains an entry. • Continues counting. **Note:** If alarms are disabled, the block continues counting when it reaches this value. **Valid Entries** The tag and field pair in tag.field format or a numeric value in the format ddd:hh:mm:ss, up

Field	Description
	to 365:23:59:59. The default target value is 365:00:00:00. When you enter a numeric value in the format ddd:hh:mm:ss, the tag converts the time into seconds for internal use while displaying the value you entered. Likewise, the Timer tag converts the value a tag and field pair into seconds for internal use. This feature allows the Timer tag to use the value from the another tag regardless of how it stores its value.
Preset Value	Lets you specify an initial value for the tag. This field also controls the value of the tag when it resets. **Valid Entries** The tag and field pair in tag.field format or a numeric value in the format ddd:hh:mm:ss, up to 365:23:59:59. The default target value is 000:00:00:00. **Note:** If you use a tag name (tag.field) in the Preset Value field, you must check the Clear on Startup check box.
Clear on Startup	Lets you specify whether the Timer tag retains the last value saved when you save the database, or resets its value to zero when loading the database (on system startup or using the Database Reload command).

Field	Description
	• If you want to retain the last value saved, clear the Clear on Startup check box. • If you want to reset the counter to a specific value, select the Clear on Startup check box and specify a value in the Preset Value field. • If you want to reset the counter to zero, select the Clear on Startup check box and leave the Preset Value field blank. • If you want to use a tag in the Preset Value field, specify the tag name in the Preset Value field and select the Clear on Startup check box.
Reset Tag	Lets you specify a tag that controls when to reset the Timer block. When the specified block's value changes from zero to one, the Timer tag resets to the value in the Preset Value field and clears any alarms. **Valid Entries** Any of the following tag types: • Digital Alarm • Digital Input • Digital Output • Boolean **Note:** Placing the upstream block off scan stops the Timer tag. When the upstream block is placed on scan again, the Timer tag restarts as defined by the Clear on Startup field.
Hold Tag	Lets you specify an optional digital tag that temporarily suspends Timer tag counting when the

Field	Description
	hold tag's value changes from zero to one. When the value changes from one to zero, the tag resumes counting. **Valid Entries** A tag name with the F_CV field.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Priority	Lets you specify the alarm priority for a tag. If the priority is equal or greater than the SCADA node's alarm priority, iFIX sends the alarm to all the alarm destinations enabled for this node. However, if

Field	Description
	the priority is less than the SCADA node's alarm priority, the alarm is automatically acknowledged and filtered out so that it does not appear in your alarm destinations. However, the alarm does appear in Data links configured to display current and latched alarms. **Valid Entries** INFO, LOLO, LOW, MEDIUM, HIGH, HIHI, or CRITICAL **Note:** To report tag alarms, the appropriate alarm areas must be assigned to each of the alarm services enabled in the System Configuration Utility (SCU).
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.
Alarm Contact Mode	Lets you specify when to open the digital tag specified in the Alarm Contact field. Select one of the following options: • **Acknowledge** – Opens the digital tag when the operator acknowledges the alarm. This mode is the default. • **Return** – Opens the digital tag when the alarm is cleared. • **All Clear** – Opens the digital tag when the alarm is acknowledged and cleared. • **Never** – Does not open the digital tag.
Alarm Contact Tag	Lets you specify a digital tag that closes when the Timer tag reaches the value specified in the Tar-

Field	Description
	get Value field. If the digital tag controls an alarm, an external horn sounds when the tag closes. If the digital tag controls a digital contact, the contact closes. **Valid Entries** The name of a: • Digital Output tag • Digital Input tag • Digital Alarm tag (in manual mode) **Note:** Disabling alarms prevents this field from generating alarms.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example**

Field	Description
	1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values

Field	Description
	that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Next Blk Processing	Lets you specify when the Scan, Alarm, and Control (SAC) program processes the next tag in the chain. Select one of the following options: • **Always** – Directs the Scan, Alarm, and Control (SAC) program to process the tag without waiting for the Timer block to reach its target value. Always is the default condition. • **Time** – Directs SAC to process the tag when the Timer tag reaches its target value.

TR Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Limits and Options

Field	Description
Low Limit	Lets you enter the tag's minimum value. **Valid Entries** • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or Signal Select tag, if the output of the tag is 10 and the Low Limit is 15, the block

Field	Description
	clamps the value at 15. You must enter a Low Limit of 10 or less to output a value of 10. If you want to display a value of 1.236 from the Calculation block, you must enter three or more decimal places in the Low Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
High Limit	Lets you enter the tag's maximum value. **Valid Entries** You can enter a high limit in one of three formats: • Standard Integer. • Expanded Decimal Notation, ranging from -9999999 to 9999999. • Scientific Notation, ranging from +/-3.4E-38 to +/-3.4E+38. • Standard integers range from -32768 to 32767 (signed integers), 0 to 65535 (unsigned integers), 0 to 999 (3BCD), or 0 to 4095 (12 Binary). **Note:** The I/O driver can set certain limitations on the engineering units range. Consult your I/O driver manual for more information. In a Calculation or a Signal Select tag, if the output of the block is 150 and the High Limit is 100, the block clamps the value at 100. You must enter a High Limit of 150 or more to output a value of 150.

Field	Description
	If you want to display a value of 1.236 from the Calculation block, you must enter three or more decimal places in the High Limit field. If you are using scientific notation, up to six decimal places may be configured with precision, and the range may be positive or negative.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius, **Note:** This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Buffer Clear Status	Lets you clear the block's data buffers every time the block is put on scan.
Input	Lets you specify the name of the tag and field that the Trend block stores. If this field is blank, the Trend block stores the value passed by the upstream block. **Valid Entries** A tag and field name pair in the tag.field (F_CV) format.

Field	Description
	Note: To chain Trend tag, enter a Trend block's name followed by the F_INP field.
Compression Factor	Lets you increase the amount of data stored in the trend history by collecting the number of samples entered in the field, averaging them, and storing up to 80 averages in the trend history. **Valid Entries** A value from 1 - 255. **Example** If you have a scan time of 10 seconds and enter 5 in the Average Compress field, the Trend tag creates a trend history of 80 averages of 5 samples. In essence the block now represents a trend history of 400 scan periods(5 x 80), or 66.66 minutes (4000 seconds). **Note:** Using this field does not affect or delay the value passed by the Next Block field to the downstream block.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector.

Field	Description
	Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.

Field	Description
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less.

Field	Description
	Valid Entries Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Field	Description
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries**

Field	Description
	None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

TT Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries**

Field	Description
	A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector.

Field	Description
	Valid Entries Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries** Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value.

Field	Description
	Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage. Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during

Field	Description
	run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Display Format	Lets you specify the number of decimal digits that appear to the right of the decimal point in an operator display. **Valid Entries** A value from 0 to 15, to indicate the digits of precision. **Note:** From a picture, the Display field can contain 15 characters total, consisting of numbers to the left and right of a decimal point.
Units	Lets you enter text describing the engineering units range. **Valid Entries** Up to 33 characters. **Example** Kilograms per square meter, Liters per minute, degrees Celsius,

Field	Description
	Note: This entry does not affect the calculation or function of any variables in iFIX. It is used strictly as a display label to identify the engineering units.
Period	Lets the tag calculate the correction factor to account for the difference in timing between the chain's scan time and the quantity being measured. When you enter a time in this field, the Totalizer block calculates the number of inputs and then divides the raw total by this number. **Valid Entries** A time in the format HH:MM:SS. **Example** Assume you are using the Totalizer tag to calculate the total number of gallons in a tank, and you have an Analog block measuring the flow (in gallons per minute) into the tank. If the Analog tag has a scan time of five seconds and is reading a flow of 50 gallons per minute, in a minute's time it will send 12 values of 50 gallons per minute to the Totalizer block. If the Totalizer block simply added these 12 values together, the result would be an erroneous raw total of 600 gallons for that one minute's time. The Per field lets the Totalizer block calculate the number of inputs and then divide the raw total by this number (that is, divide by 12): • #inputs/period = period/scan time • corrected total/period = raw total/# inputs

Field	Description
	Therefore, if you enter 00:01:00 (one minute) in the Per field, the Totalizer block automatically divides the raw total (600 gallons) by the number of inputs (12) per period. This gives you a correct value of 50 gallons entering the tank within the minute.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Previous Block	Displays the name of the previous (upstream) tag. **Valid Entries** None. This is a read-only field.
Next Block	Displays the name of the next tag in the database chain. You can select a tag for this field by clicking the browse button. **Note:** In a Statistical Data tag, the Next Block field specifies the tag name of the down-

Field	Description
	stream Statistical Control tag. No other tag type is valid.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

TX Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Process by Exception	Enables exception-based processing for the tag.
Scan Time	Lets you specify how often the Scan, Alarm, and Control (SAC) program processes the tag and any tags (blocks) chained to it. **Valid Entries**

Field	Description
	• 0 (one shot processing) • 0.05 to .95 in .05 increments (subsecond scan times) • 1 to 60 in 1 second increments • 1M to 60M in 1 minute increments • 1H to 24H in 1 hour increments **Example** 0.15 specifies a 15-subsecond scan time. 5 specifies a 5-second scan time, 10M specifies a 10-minute scan time, 16H specifies a 16-hour scan time.
Phase At	Lets you specify how long the Scan, Alarm, and Control (SAC) program delays in scanning the tag. When the tag has a second or subsecond scan time, SAC offsets the initial scan by the phase time when iFIX starts or when the database is reloaded. When the tag has a scan time of 1 minute or longer, SAC offsets the initial scan starting at midnight. **Valid Entries** Depends on the scan time. If the scan time is in hours, the phase must be in hours:minutes. If the scan time is in minutes, the phase must be in minutes:seconds. If the scan time is in seconds, the phase must be in seconds. If the scan time is in subseconds, the phase must be in subseconds.

Alarm Options

Field	Description
Alarm Areas	Displays the alarm areas that receive alarms and messages generated by this tag. Double-click an item in the list box and select an alarm area with

Field	Description
	the Browse button, or enter the alarm area name in the field. **Valid Entries** ALL or up to 15 alarm area names.
Enable Alarm	Lets you enable or disable alarming for this tag. When you enable alarming, the tag generates alarms allowing objects in your operator displays to show alarm conditions, and enabling other tags to detect alarms from the tag. **Note:** The entire chain can be affected when you disable alarms for a tag. In addition, for both the Digital and Analog Alarm tags, this field is ignored when you enable the Alarm Suspend field.
Enable Event	Lets you enable or disable event messaging for the tag. Event messaging is similar to alarming except that it does not require acknowledgment. Event messages are sent to the same alarm destinations as alarms for a given block but do not appear in the Alarm Summary object. Analog Output, Analog Register, Digital Output, Digital Register, Digital Input, and Text tags have event messaging capabilities. **Note:** Be careful when using event messaging in a chain with a time-based scan time. If the scan time is short, your alarm files (either disk or printed) can grow very large. We recommend enabling event messaging for

Field	Description
	exception-based chains, one shot chains, and stand-alone output blocks.
Shelve Enable	Select this check box to enable Alarm Shelving for the tag.
Shelve Policy	Select an alarm shelving policy from the drop-down list.

Historian

Field	Description
Tag Description	Lets you enter the tag description that is used by Historian when the tag is collected.
Collect	Lets you select if the tag is set for collection by the Proficy Historian collector. Select Enabled to allow the tag to be collected by the collector.
Collection Interval	Lets you set the collection interval, or the amount of time between readings of data of this tag by the Proficy Historian collector. **Valid Entries** Must be entered in 100 ms intervals. The default value is 5000ms. **Example** 1500 is a valid entry, because it is in 100ms intervals. However, 1545 is not a valid entry, because it is not in 100ms intervals.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. **Valid Entries**

Field	Description
	Any numeric value that does not exceed the collection interval. The value is in seconds. **Examples** If you want to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), you would enter a collection interval of 1 hour and an offset of 30 minutes. If you want to collect a value each day at 8 am, you would enter a collection interval of 1 day and an offset of 8 hours.
Time Resolution	Lets you select the Time Resolution, or the level of precision for the timestamps for the GE Historian collector. Select either Milliseconds or Seconds.
Collector Compression	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Collector Deadband	Lets you select if the tag is set for compression. Compression applies a smoothing filter to incoming data by ignoring incremental changes in values that fall within a deadband centered around the last reported value. Select Disabled to prevent the tag from being compressed.
Compression Type	Lets you select if the deadband value entered in the Collector Deadband field is an absolute value or a percentage.

Field	Description
	Select Absolute to set the Collector Deadband value to an absolute value. Select Percentage to set the Collector Deadband value to a percentage of the Engineering Units, which are specified on the Basic tab.
Compression Time-out (ms)	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. The Collector Compression Timeout value should be in increments of your collection interval, and not less. **Valid Entries** Any numeric value.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.

Field	Description
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.

Advanced Options

Field	Description
Startup Mode	Lets you select the tag's mode on startup. In Automatic mode, the tag receives data from the I/O driver, OPC server, or OPC UA server. In Manual

Field	Description
	mode, the tag receives data from the operator, scripts, recipes, or Program blocks.
Initial Scan	Lets you select whether the tag is initially placed on or off scan. Click On Scan to place the tag on scan as soon as the Scan, Alarm, and Control (SAC) program starts or when the database is loaded. Click Off Scan to place the tag on scan by a Program block, an Event Action tag, a script, an operator entry in a Data link, or an Easy Database Access program.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.
Message Length	Lets you specify the length of text that the tag reads and writes. **Valid Entries** 1 to 80 characters.

Field	Description
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

TXR Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries** Tag names must begin with a letter or number and can be up to 256 characters, including certain spe-

Field	Description
	cial characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
Message Length	Indicates the number of bytes to read from the poll table. Maximum value is 80. **Note:** Most GE drivers will only read or write an EVEN number of bytes and will round

Field	Description
	'down'. For that reason, it is strongly recommended that this value be EVEN.

E-Signature

Field	Description
Type	The Type of Electronic Signature: • Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electron-

Field	Description
	ic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources. When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a

Field	Description
	specific security area even if they cannot write to that area.
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

TXT Tag

This tag contains the following details:

General

Field	Description
Tag Name	Lets you enter the tag's name. The tag name is referenced by other tags, display links, and other programs. Each tag's name must be unique in the database. If you need to change a tag's name, copy the tag and rename it. **Valid Entries**

Field	Description
	Tag names must begin with a letter or number and can be up to 256 characters, including certain special characters. Tag names must also contain at least one non-numeric character. For iFIX internal databases, single quotes are not supported in tag names. Tag names can also include dashes (-), underscores (_), forward slashes (/), exclamation points (!), pipes (|), number signs (#), open brackets ([), close brackets (]), percent signs (%), and dollar signs ($). **Invalid Entries** You cannot use the following special characters in a tag name: ~ ` + ^ : ? " * = { } . , ; ? @ **Examples** AI1, CA_10, DI#, 4PID, 'TEST'
Description	Lets you enter optional descriptive text about the tag. **Valid Entries** A text string of up to 256 characters can describe the block and its function. This string is appended to each alarm message and can also be shown on operator displays.
Type	The tag type. Display-only field.
Current Value	The current value of the tag in the database. Display-only field. Click the update button to update the displayed value, if one exists.

I/O Addressing

Field	Description
I/O Driver	Lets you select an I/O driver, OPC server, or OPC UA server for the tag. The selected driver or server enables the tag to communicate with process hardware on the plant floor. Before you can select an I/O driver, OPC server, or OPC UA server you must install it and add it to the available ones in the SCU.
I/O Address	Lets you enter the location in the process hardware where data for this tag is saved and where output is sent. **Valid Entries** Depends on your driver. Consult your I/O driver or server manual for details on the proper input/output addresses and configurations.  **CAUTION:** Do not assign the same I/O address to tags when using exception-based and time-based processing. Doing so will cause the exception-based tags to occasionally miss a value.  **CAUTION:** Configuration Hub currently does not do I/O address validations before publish. If you enter an invalid IO address into a tag or generate an invalid I/O address via the model and substitutions, the publish may fail to set the IO address into the active database, and your invalid IO address will be removed.

Field	Description
Signal Conditioning	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.
H/W Options	Lets you select how to map the range of values coming from your process hardware into the tag's EGU range. **Note:** Signal conditioning and linear scaling cannot be applied simultaneously. If you select a value for Signal Conditioning verify that Linear Scaling is not selected. **Valid Entries** Depends on your driver or server. Refer to your driver or server manual for more information.

Limits and Scaling

Field	Description
Low Limit	Used to clamp input and to scale output. In most cases you should enter the low and hi EGU ranges for the TXT block as 0 to 65535, as this is the range of a 16 bit integer value. The text lookup ta-

Field	Description
	ble on the 2nd page of the TXT dialog requires that you enter exact integer values which will also generally be in this range.
High Limit	Used to clamp input and to scale output. In most cases you should enter the low and hi EGU ranges for the TXT block as 0 to 65535, as this is the range of a 16 bit integer value. The text lookup table on the 2nd page of the TXT dialog requires that you enter exact integer values which will also generally be in this range.
Units	For display purposes.

Text Strings

Field	Description
Target Value 0-16	The list of 16 target values for which the block will check for an exact match. These will default to powers of 2. NOTE: The system will NOT check for duplicates; it will use the first exact match found. The values must be within the EGU range of the block. Although these values are entered as floating point numbers it is STRONGLY recommended that you restrict your use to integers since they must exactly match the value returned from the I/O driver.
Target State 0-16	The list of 16 corresponding ASCII strings. The strings are up to 40 bytes each.

E-Signature

Field	Description
Type	The Type of Electronic Signature:

Field	Description
	• Select None to require no Electronic Signature for this tag. • Select Perform Only to require a Perform By signature for any data entry changes or alarm acknowledgements for this tag. • Select Perform and Verify to require both a Perform By and a Verify By signature for any data entry changes or alarm acknowledgements for this tag.
Remember User	Select to allow the operator to repeatedly sign for successive actions by supplying only a password. Continuous use applies only to the person performing an action and does not affect the person verifying an action.
Exempt Alarm Ack	Select to allow operators to acknowledge alarms for this tag without entering a signature, even if this tag requires electronic signatures for data entry.
Comment Required	Select this option to enable Comment enforcement in the Perform Comment section. This means that the operator must enter comments in the Comment box in the Electronic Signature section during run mode. Comments in the Verify Comment section are optional. The Perform by Comments Required check box appears in every tag configuration where Electronic Signature settings are available. By default, this check box is disabled.
Unsigned Writes	Select to allow this tag to accept or reject unsigned writes. Unsigned writes can originate from scripts, recipe downloads, and other data sources.

Field	Description
	When an unsigned write is rejected, a message is sent indicating that the tag rejected an unsigned write. This is the default selection.

Advanced Options

Field	Description
Enable Output	Lets you configure the tag to send output to the I/O driver, OPC server, or OPC UA server. The tag sends its output when it is in Automatic mode and converts its data according to the entries in the Low Limit (EGU), High Limit (EGU), and Signal Conditioning fields.
Case Sensitive	Enter Y if operator entry must exactly match the string defined in the block. If N (no) then 'ONE', 'One' and 'one' are all equivalent. If YES then they are not.
Security Areas	Lets you specify up to three security areas to restrict operator access to the tag. To change the value of a write-protected tag in the Database Manager or the iFIX WorkSpace, the operator must have access to that tag's security area. **Valid Entries** One security area name per field, ALL, or NONE (disables tag security). iFIX names security areas A-P by default. **Note:** Read access for database tags is available to all users regardless of security area. This allows users to retrieve data from a specific security area even if they cannot write to that area.

Field	Description
Alarm Field 1	Lets you enter text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.
Alarm Field 2	Lets you enter more text about the tag. Typically, one of these alarm fields contains a path to a picture you want to associate with the tag. Refer to the Implementing Alarms and Messages electronic book for more information. **Valid Entries** Text, up to 80 characters.

Project Security

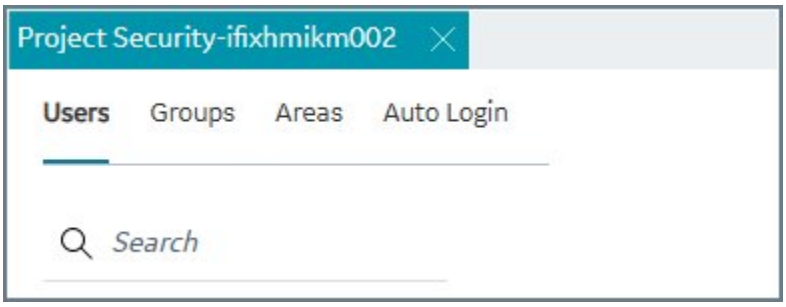
Overview of Project Security

Configuration Hub allows you to manage your iFIX users, groups, and security areas from the Project Security panel. It also allows you to access iFIX Auto Login settings.

Overview of Project Security

To access Project Security settings:

- From the Navigation panel, select your node, the iFIX project, and then **Project Security**. The Project Security menu appears as shown in the following figure.



From the Project Security panel, you can do the following:

- Add or Modify Users *(on page 931)*
- Add or Modify Groups for Proficy Authentication *(on page 934)*
- Add or Modify Security Areas *(on page 935)*
- Auto Login Configuration *(on page 937)*

Limitations for Project Security Settings in Configuration Hub

When configuring security settings from the Project Security panel, be aware that assignment of direct Application Features and Security Areas is not supported from the Users page of the Project Security panel. To do this, use the security Groups page. *(on page 934)*

For iFIX users which already have Application Features and/or Security Areas assigned outside of Configuration Hub, be aware that:

- Those details will not be shown in Configuration Hub. However, you can view other user details and still can edit these users through Configuration Hub.
- After editing and publishing these iFIX users, their existing Application Features and Security Areas assignments will remain intact and other edits will get applied to that user.
- When deploying these iFIX users, existing Application Features and Security Areas assignments will be lost as only user information that is visible in Configuration Hub is sent to target node when the Deploy is performed.

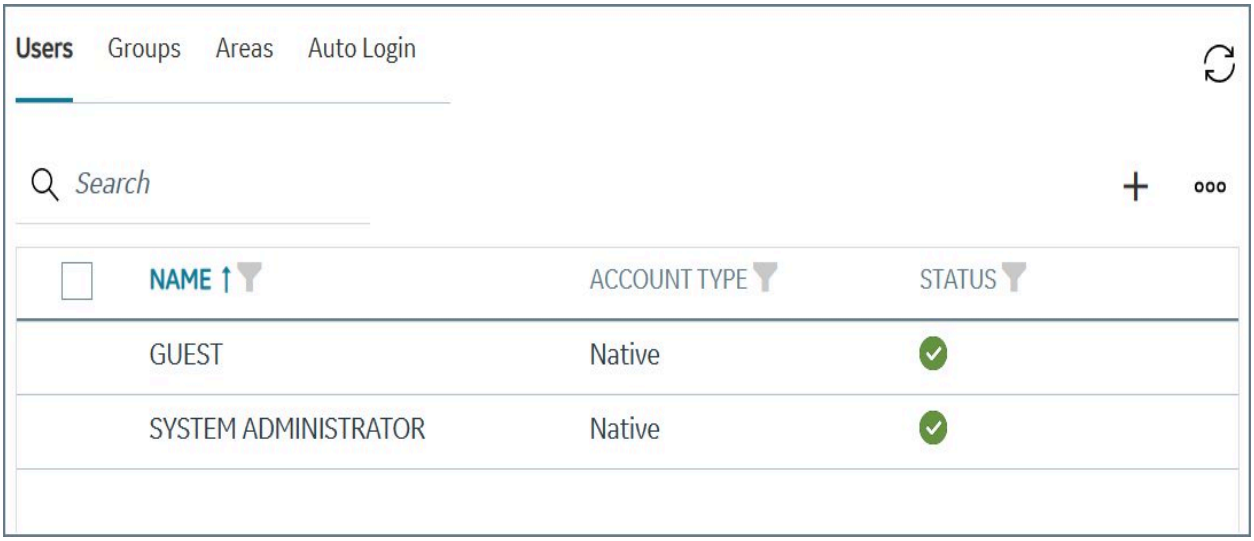
Add or Modify Users

Configuration Hub allows you to manage your iFIX Users from the Project Security panel. User accounts define the security areas, application features, and group accounts available to individuals.

Manage Users

To manage users:

1. From the Navigation panel, select your node, the iFIX project, and then **Project Security**.
2. Click **Users**. The user security settings appear as shown in the following figure.



User Details

The following table describes the details you can manage for each user.

Field	Description
User Full Name	Displays the full name of the operator whose account you are defining as an iFIX user. You can change the text by typing a new name, up to 30 alphanumeric characters in length. The name you enter must be unique.
Login Name	Contains the login name of the user. You can change the text by entering a new name. The user enters this name when logging in to iFIX. If you enable Windows security for this account, the login name must match the login name of the operator's Windows user account. The login name you enter must be unique.

Field	Description
Password	Displays the account password. Entering a password is optional. Each password can be up to 20 alphanumeric characters. The password is not displayed in this field for security reasons. When you create or modify a password, the field displays an asterisk (*) for every character you specify. iFIX user passwords are case insensitive when not using Windows security
Account Type	Specifies whether the user is a Native or Windows user. This is view-only field.
Domain	Displays the account domain name when Windows security is enabled. The domain name can be up to 20 alphanumeric characters. Be aware that when configuring your Windows users in iFIX Security, the Domain Name entry needs to be your domain's NetBIOS name.
Login Timeout	Controls the length of time operators can remain logged in Windows. You can enter any time interval from 00:00:01 to 23:59:59. A value of 00:00:00 disables this field. When an operator attempts to access a restricted application feature or security area after the time interval expires, iFIX logs out the operator, requiring him or her to log in again. This feature prevents operators from remaining logged in indefinitely. This feature does not eliminate the need for operators to manually log out, particularly if you have strict security requirements. If you decide to use this feature, consider it a safety mechanism.
Groups	Lists the groups this user has access to.

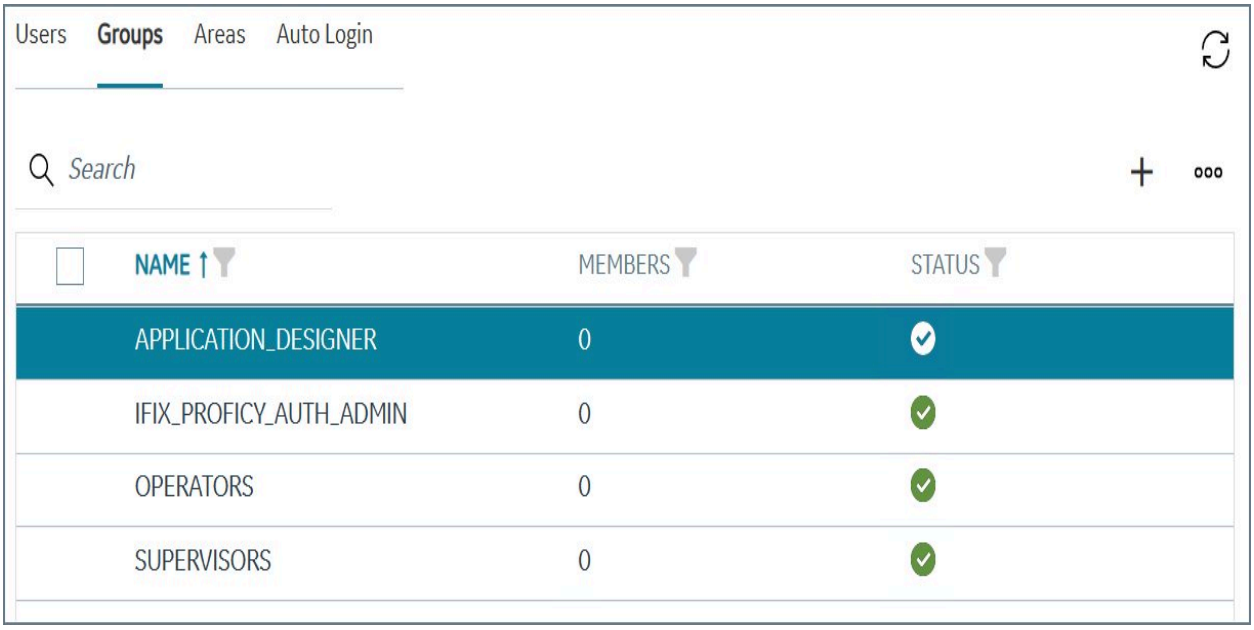
Add or Modify Groups for Proficy Authentication

Configuration Hub allows you to manage your iFIX security groups from the Project Security panel. Group accounts define the security areas and application features available to group members.

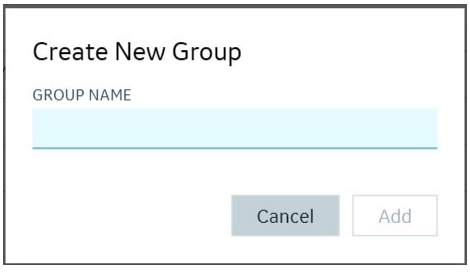
Manage Groups

To manage groups:

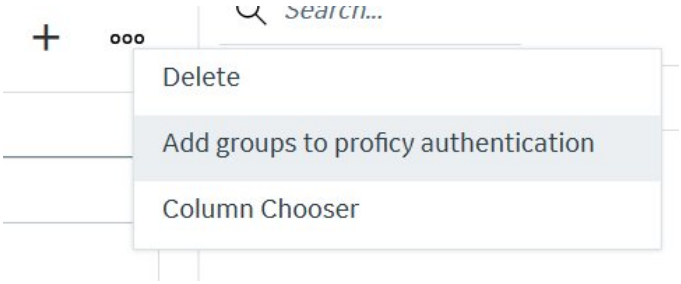
1. From the Navigation panel, select your node, the iFIX project, and then **Project Security**.
2. Click **Groups**. The group security settings appear as shown in the following figure.



To add a group, click the plus (+) sign at the top of the grid. the Add Group dialog box appears.



To add a group to Proficy Authentication, right-click the group in the list, and then select **Add Groups to Proficy Authentication**.



Group Details

The following table describes the details you can manage for each group.

Field	Description
Name	Displays the name of the group account you are defining. You add or modify the text by typing a name, up to 30 alphanumeric characters in length.
Security Areas	Displays the security areas *(on page 935)* accessible to this group.
Application Features	Displays the iFIX application features accessible to this account.

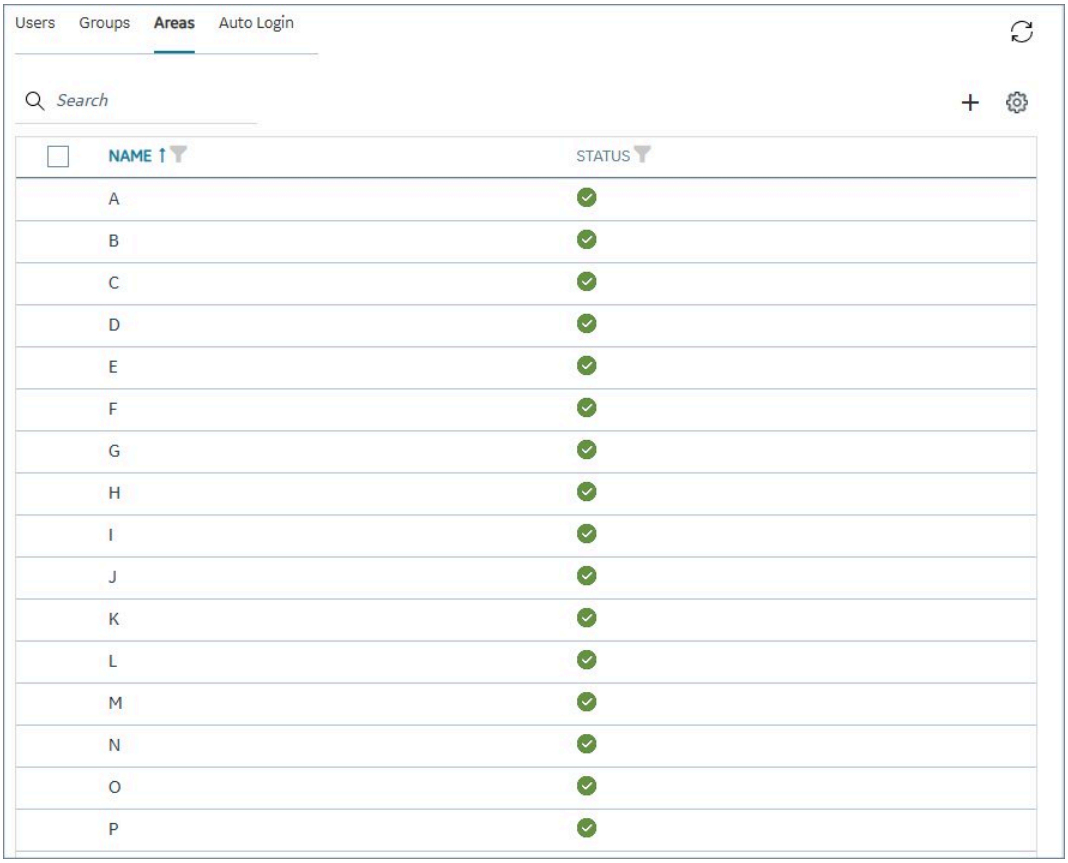
Add or Modify Security Areas

Configuration Hub allows you to manage your iFIX security areas from the Project Security panel.

After you define your users and groups, the next step is to define your security areas and specify a name for each area. You can define up to 254 security areas, and each name can be up to 20 characters. iFIX names the first 16 security areas A through P, by default. However, you can rename these areas or create a new area. After you define a security area, you can assign it to a group or user account.

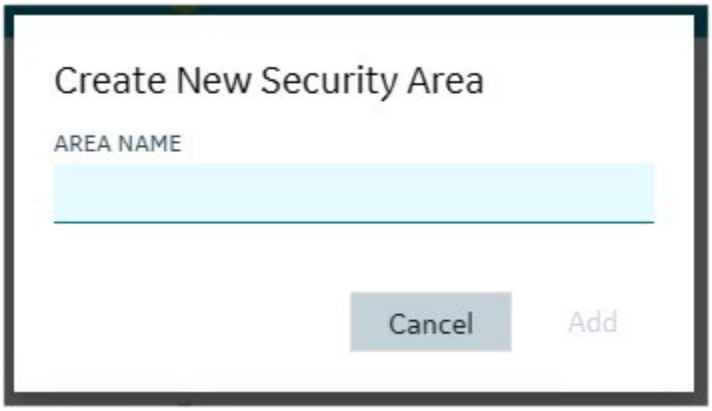
To manage security areas:

1. From the Navigation panel, select your node, the iFIX project, and then **Project Security**.
2. Click **Areas**. The security areas appear as shown in the following figure.



Click in the Area Name field to change the name of a security area.

To add a security area, click the plus (+) at the top of the security area list. The Create New Security Area dialog box appears. Enter a name and click Add.



Auto Login Configuration

You can set up iFIX to log in an operator automatically when the user starts iFIX. Configuration Hub allows you to manage iFIX auto login information from the Project Security panel.

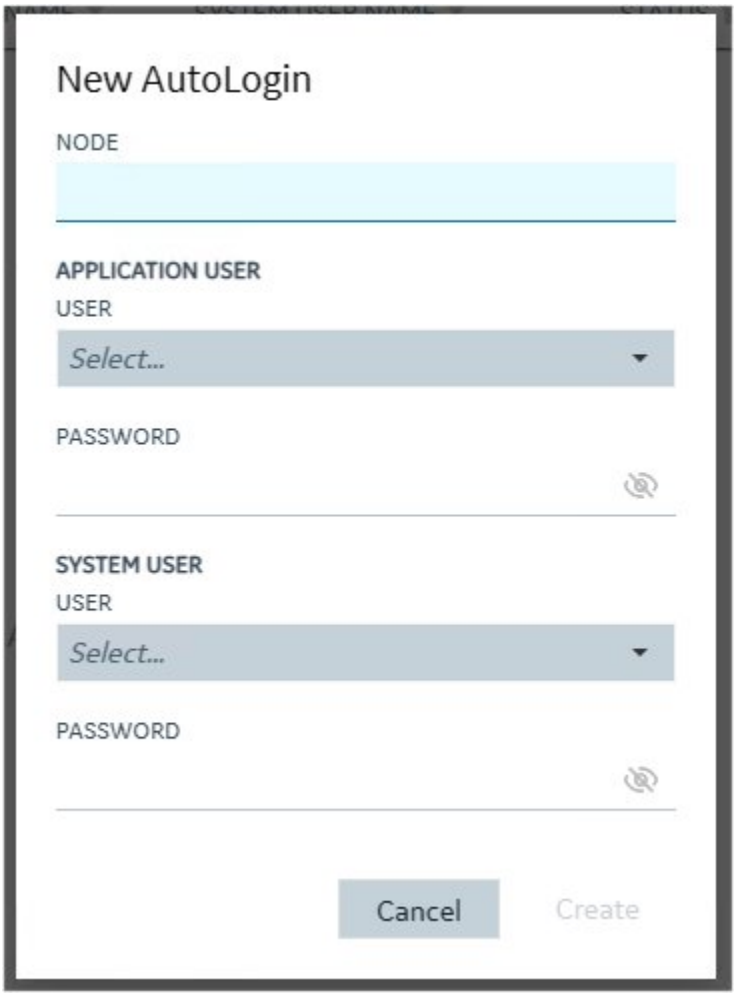
You can create this auto login configuration by specifying the name of the:

- Node you want to automatically log in.
- User you want logged in.

To manage auto login settings:

1. From the Navigation panel, select your node, iFIX project, and then **Project Security**.
2. Click **Auto Login**. The Auto Login settings appear as shown in the following figure.

To add auto login settings, click the plus (+) icon at the top of the grid. The New Auto Login dialog box appears as shown in the following figure.



Enter the following information, and click **Create** to add auto login information.

Field	Description
Node	The name of the node that you want to provide automatic login for the specified user.
Application User	Select an iFIX application user from the drop-down list.
Application User Password	The password for the application user.
System User	Select a system user from the drop-down list.
System User Password	The password for the system user.

Alarms

Defining Alarm Areas

Configuration Hub allows you to manage your iFIX alarm areas from the Alarms panel.

Overview of Alarm Areas

One of your first tasks when configuring alarms is to create alarm areas by naming them. iFIX provides 16 default alarm areas, named A through P; however, you can rename the default areas or add new ones. Each alarm area name you enter must be unique and can be up to 29 alphanumeric characters.

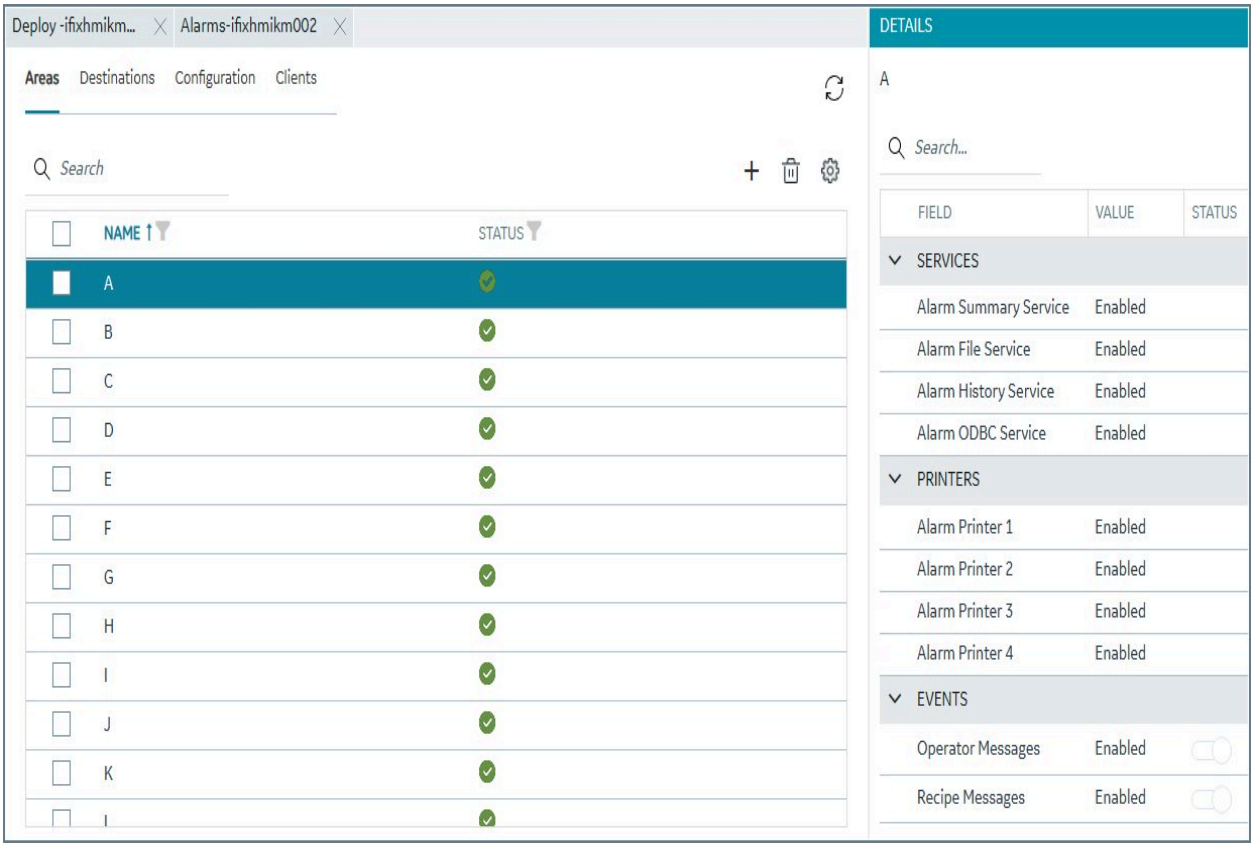
In order to enter or edit an alarm area name, iFIX must be running. In addition, you can only edit the alarm area database from a SCADA server.

Alarm area names cannot contain the characters "*", "?", or "\".

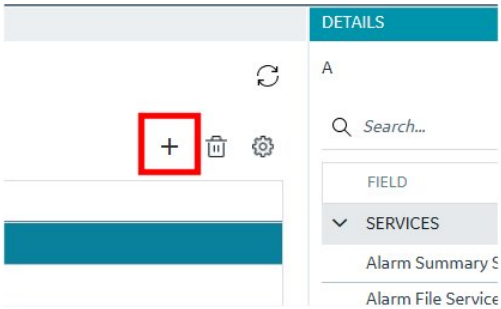
Access Alarm Areas

To access Alarm Areas:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Areas**. The Alarm Areas settings appear as shown in the following figure.



To add an Alarm Area, click the plus (+) icon to access the Common Alarm Areas Configuration *(on page 953)* dialog box.



Alarm Area Details

For each of the alarm areas you can configure what is enabled for:

- Alarm Services *(on page 941)*
- Alarm Printers *(on page 946)*
- Alarm Events *(on page 948)*

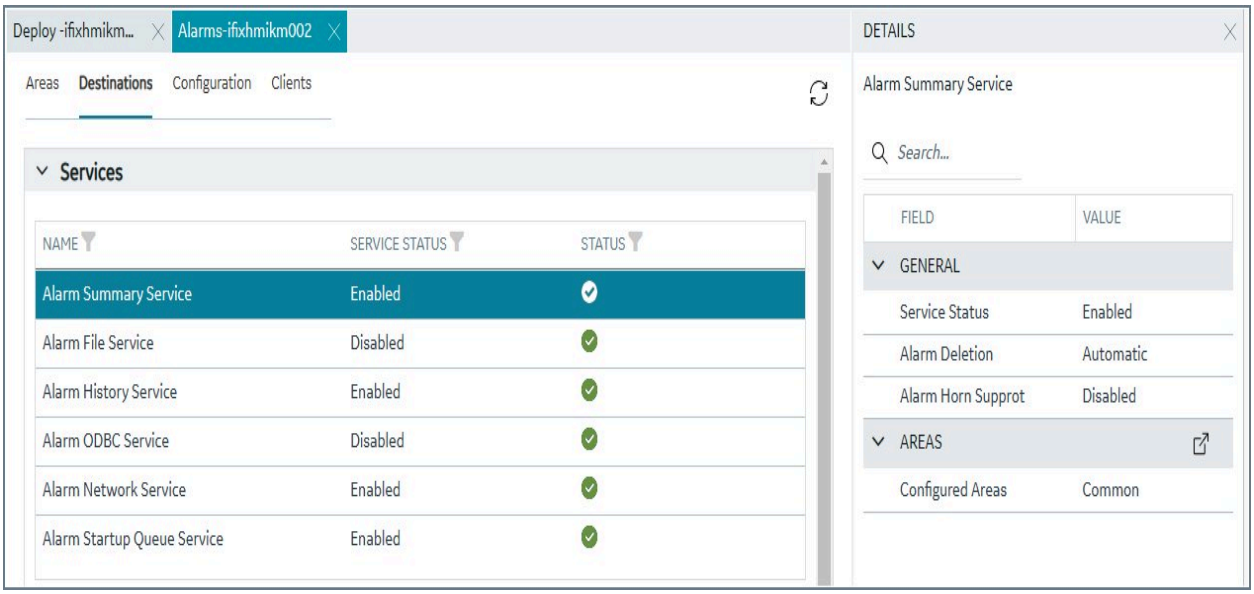
Alarm Services

Configuration Hub allows you to manage your iFIX alarm services from the Alarms panel.

Access Alarm Services

To access Alarm Services:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Destinations**. The Alarm Services settings appear as shown in the following figure.



Details for Alarm Services

The following tables describe the details you can manage for alarm services.

Table 7. Alarm Summary Service

Field	Description	Default
Service Status	Species whether the service is enabled or disabled. By default, the Alarm Summary Service automatically deletes an acknowledged alarm when the block's current value returns to normal. If you do not want to	Enabled

Table 7. Alarm Summary Service (continued)

Field	Description	Default
	delete acknowledged alarms automatically, you can disable this feature and delete the alarms manually by re-acknowledging them after the block's value returns to normal.	
Alarm Deletion	Specifies whether alarms can be deleted automatically or manually.	Automatic
Alarm Horn Support	Allows you to enable the alarm horn so that an alarm sounds when a new alarm appears. The horn repeats at three speeds to distinguish between low, medium, and high priority alarms. A one-second increment between beeps signifies high priority alarm, a two-second increment signifies a medium priority, and a three-second increment signifies a low priority.	Disabled
Configured Areas	Specifies whether to use Common alarm areas, or specific alarm areas for the specified alarm service. Select the  button to pick your options.	Common

Table 8. Alarm File Service

Field	Description	Default
Service Status	Species whether the service is enabled or disabled.	Disabled

Table 8. Alarm File Service (continued)

Field	Description	Default
	When enabled, the Alarm File service receives alarms and messages, and saves them to a text file, yymmdd.ALM. This file resides in the Alarm path.	
Configured Areas	Specifies whether to use Common alarm areas, or specific alarm areas for the specified alarm service. Select the  button to pick your options.	Common
Use Common Message Format	Leave the default of yes, or click the  button to display the Alarm File Service Message Format Configuration dialog box, and select the service's message format.	Yes

Table 9. Alarm History Service

Field	Description	Default
Service Status	Species whether the service is enabled or disabled. Be sure that the Alarm History Service is always enabled. If the Alarm History Service is disabled, you may receive an error message stating that no destination is currently available to dispatch the alarm.	Enabled
Configured Areas	Specifies whether to use Common alarm areas, or specific alarm areas for the specified	Common

Table 9. Alarm History Service (continued)

Field	Description	Default
	alarm service. Select the  button to pick your options.	
Use Common Message Format	Leave the default of yes, or click the  button to display the Alarm File Service Message Format Configuration dialog box, and select the service's message format.	Yes

Table 10. Alarm ODBC Service

Field	Description	Default
Service Status	Species whether the service is enabled or disabled. When enabled, this service sends alarms and messages to an ODBC-compliant relational database, allowing you to retrieve any information you want by querying the database. You can use the iFIX ODBC Alarm Service Configuration dialog box to configure the Alarm ODBC Service.	Disabled
Configured Areas	Specifies whether to use Common alarm areas, or specific alarm areas for the specified alarm service. Select the  button to pick your options.	Common
ODBC Configure	Describes whether this feature is configured. Select the  to	No

Table 10. Alarm ODBC Service (continued)

Field	Description	Default
	configure your Alarm ODBC Service.	

Table 11. Alarm Network Service

Field	Description	Default
Service Status	Species whether the service is enabled or disabled. If your system is networked, be sure that the Alarm Network Service is always enabled. If the Alarm Network Service is disabled, you may receive an error message stating that no destination is currently available to dispatch the alarm.	Enabled
Send Startup Queue to Original Typers	Select the Send Startup Queue Alarms to Original Typers check box to distribute alarms from the SCADA server to all the enabled alarm destinations on the View client. Clear the check box if you want to send the alarms to the Alarm Summary and Alarm Startup Queue Services, or if the Alarm Queue Service is disabled.	Check box cleared

Table 12. Alarm Startup Queue Service

Field	Description	Default
Service Status	Species whether the service is enabled or disabled. When enabled, the Alarm Startup Queue Service provides a View	Disabled

Table 12. Alarm Startup Queue Service (continued)

Field	Description	Default
	client with a list of the alarms that occurred on a SCADA server prior to starting iFIX on the View client. In addition, iFIX can send messages to the Alarm Start-up Queue Service along with the alarms. If you are using the Startup Queue, be sure to enable the Alarm Summary Service.	
Summary Alarms Only	Select the Summary Alarms Only check box to receive alarms and messages. To receive only alarms from the Alarm Summary Service, leave the check box selected.	Check box selected
Enable Time Filter	If you want to filter alarms by time, select the Enable Time Filter check box and then enter the maximum age of the alarms and messages you want to receive in the Hours and Minutes fields.	Check box cleared
Filter Alarms Older Than	The maximum age of the alarms and message you want to receive.	23:59:59

Alarm Printers

Configuration Hub allows you to manage your iFIX alarm printers from the Alarms panel.

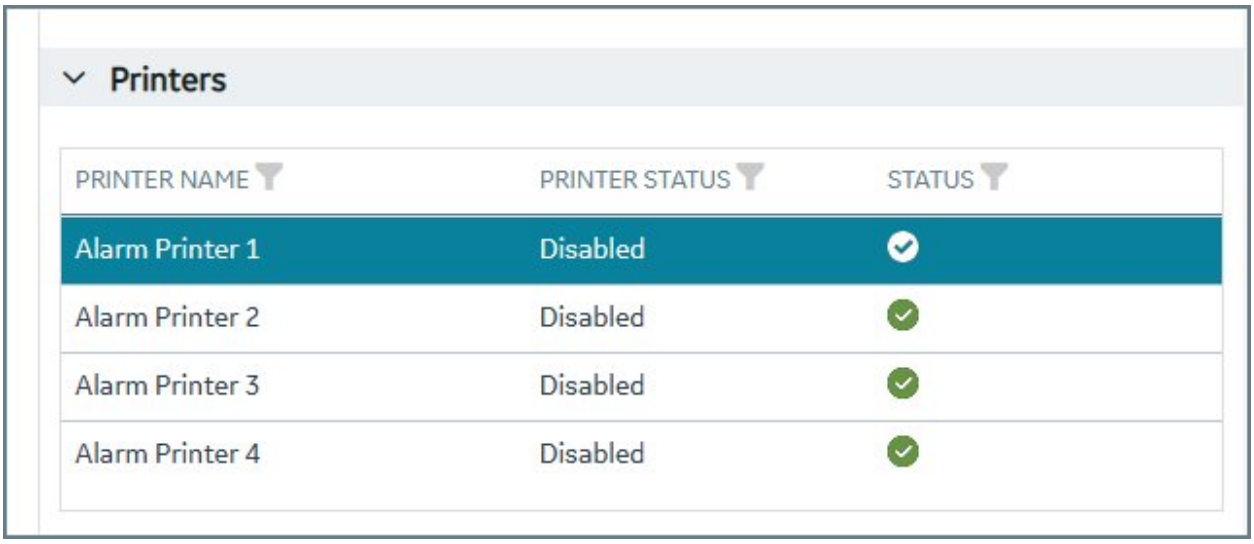
Alarm Printers Overview

You can configure up to four Alarm Printer Services for your nodes. For each alarm printer service, you select a printer port and enter a name in the Alarm Printer Configuration. For each printer service, you can connect the printer to serial ports (COM) 1 or 2, to parallel ports (LPT) 1 or 2, or to a USB port. Keep in mind that each printer service must be attached to a unique port, and that the printer name can be up to 32 alphanumeric characters. If you have multiple USB ports and need to specify the USB port, use the Printer.ini as described in Specifying a USB Port with the Printer.ini File in the iFIX e-books.

When configuring the Alarm Printer Service, you can also select the alarm areas and message format you want for the Alarm Printer Service.

To access Alarm Printers:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Destinations**, and scroll to the Printers areas. The Alarm Printers settings appear as shown in the following figure.



Details for Alarm Printers

Table 13. Alarm Printer Fields

Field	Description	Default
Service Status	The status of the alarm printer service: Enabled or Disabled.	Disabled

Table 13. Alarm Printer Fields (continued)

Field	Description	Default
Port Definition	The port to use for the Alarm Printer service.	COM#
Printer Name	The name of the Alarm Printer.	Alarm Printer #
Configured Alarm Areas	Specifies whether to use Common alarm areas, or specific alarm areas for the specified alarm service. Select the button to pick your options.	Common
Message Format > Use Common Format	Leave the default of yes, or click the button to display the Alarm File Service Message Format Configuration dialog box, and select the service's message format.	Yes

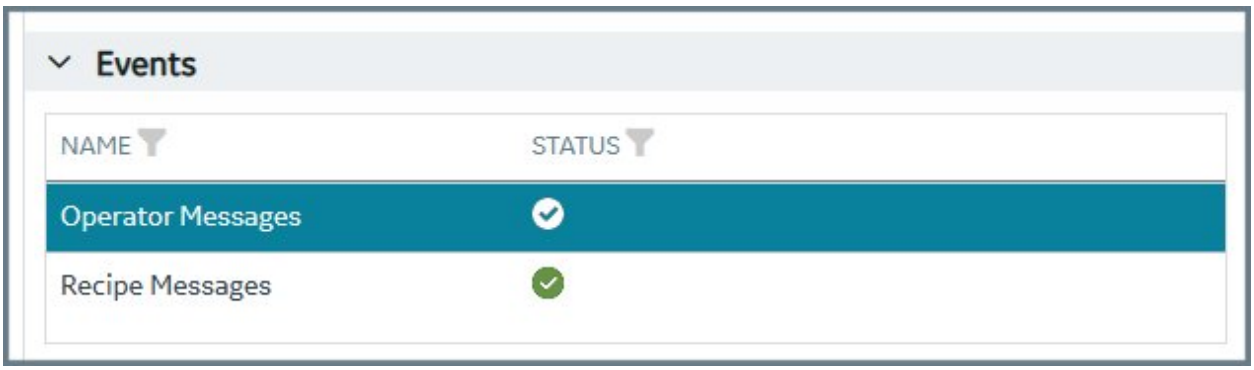
Alarm Events

Configuration Hub allows you to manage your iFIX alarm events from the Alarms panel.

Alarm Events Overview

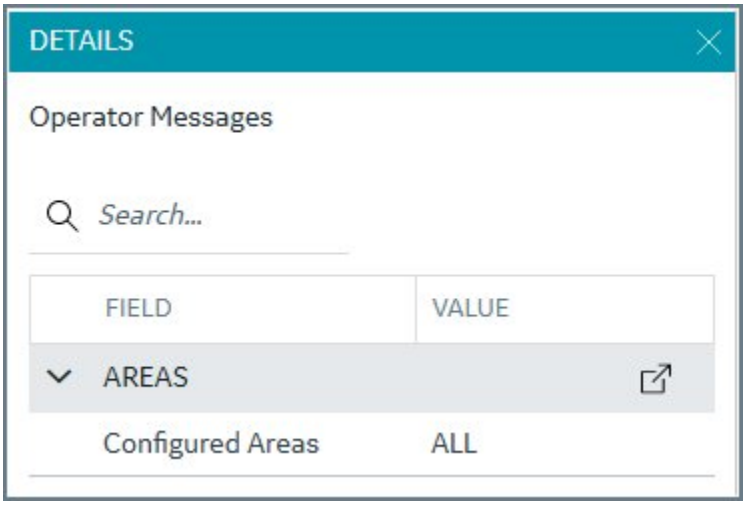
To access Alarm Events:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Destinations**, and scroll to the Events areas. The Alarm Events settings appear as shown in the following figure.

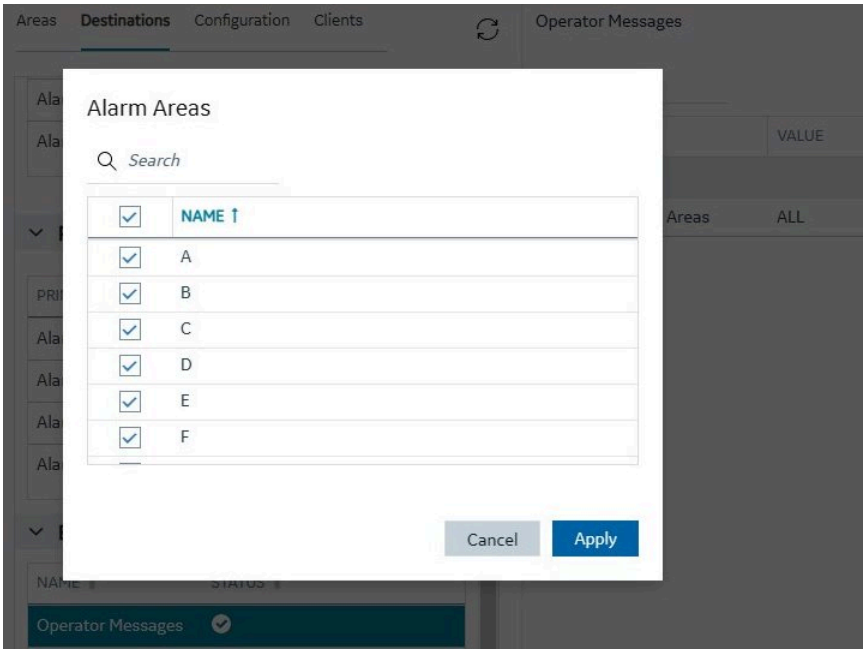


Details for Alarm Events

For alarm events, you can also configure the alarm areas from the Details panel, as shown in the following figure.



Select the  button to pick open the Alarm Areas dialog box and pick your options.



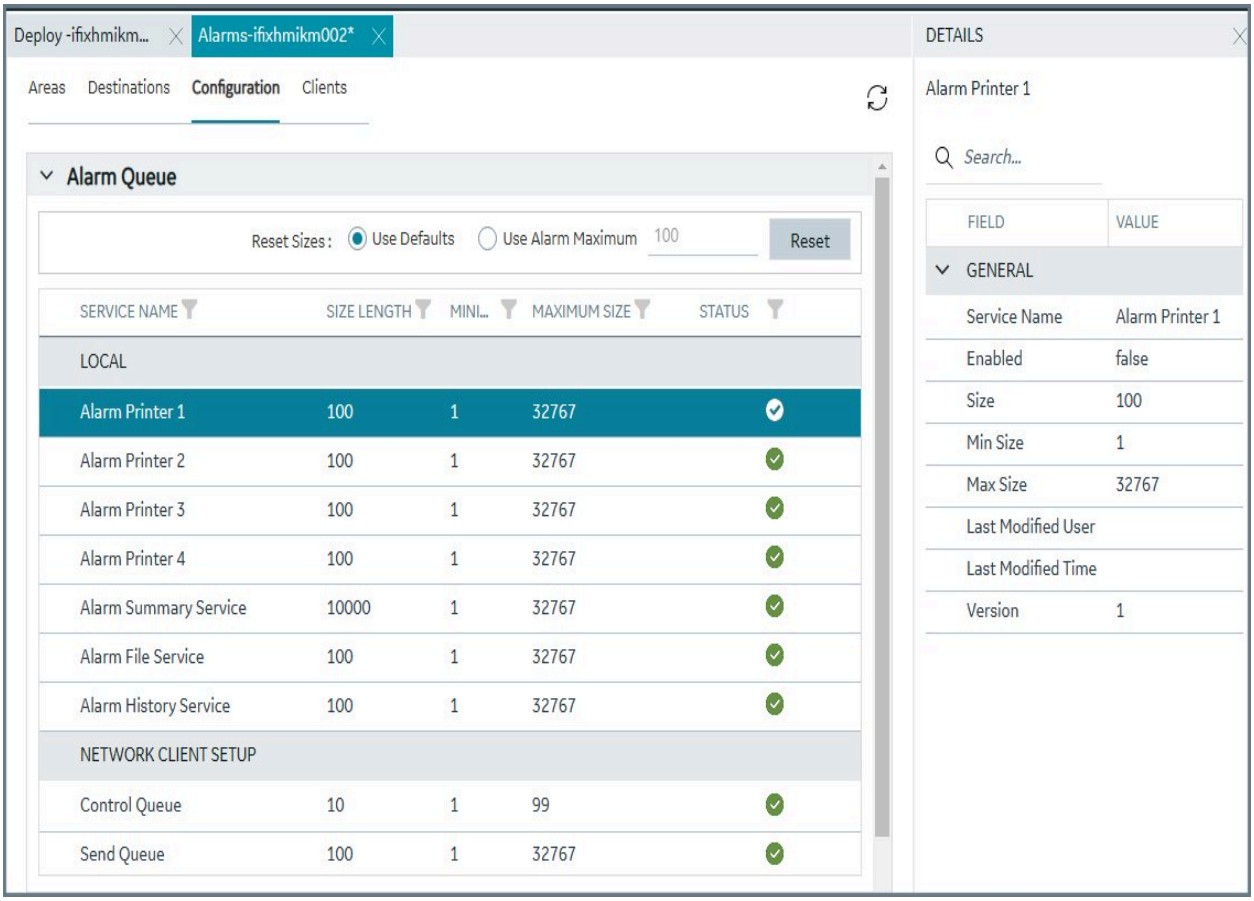
Alarm Queue Configuration

Configuration Hub allows you to manage your iFIX alarm queue configuration from the Alarms panel.

Alarm Queue Overview

To access Alarm Queue Configuration:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Configuration**. The Alarm Queue settings appear as shown in the following figure.



Details of Alarm Queue Configuration

The following table displays the read-only fields of the Alarm Queue Configuration.

Field	Description
Service Name	The name of the Alarm service.
Enabled	Whether the Alarm service is enabled or disabled.
Size	The actual size of the service. The queue size is the number of records stored in the alarm queue.
Min Size	The minimize size of the queue. This value can be any number from 1 to 32,767.
Max Size	The maximum size of the queue. This value can be any number from 1 to 32,767.

Field	Description
	The maximum queue size is the maximum number of records stored in the alarm queue.
Last Modified User	The name of the user who last modified the service.
Last Modified Time	The current time of the last modification.
Version	The version of the queue.

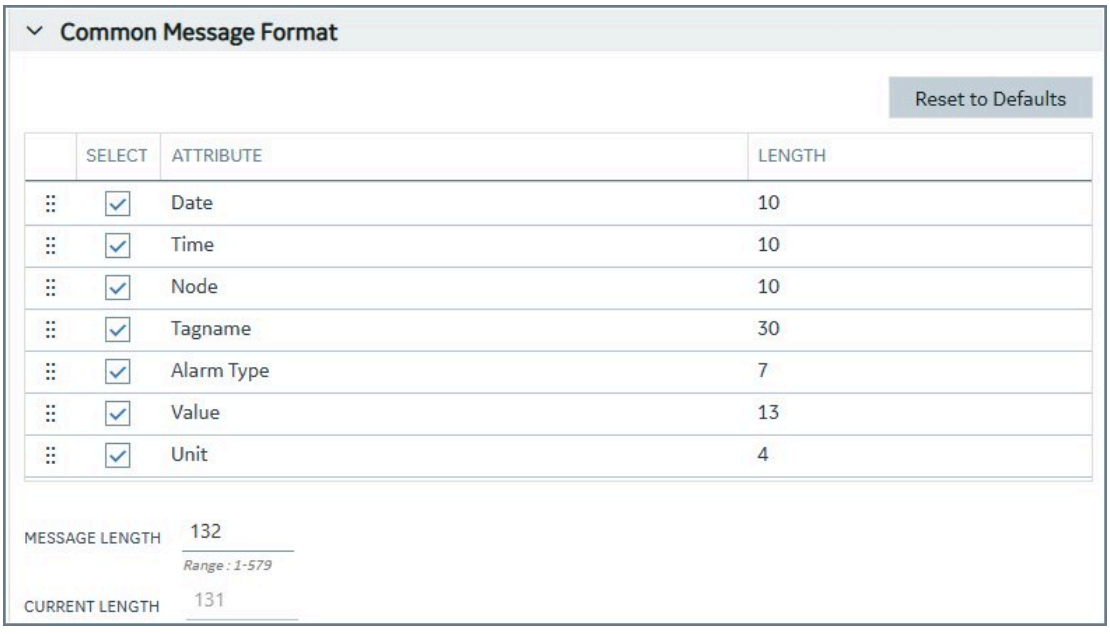
Common Message Format Configuration

Configuration Hub allows you to manage your iFIX alarm message format from the Alarms panel.

Overview of Alarm Message Format Configuration

To access Alarm Message Format Configuration:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Configuration** and scroll to the Common Message Format section. The Common Message Format settings appear as shown in the following figure.



Details of Alarm Message Format Configuration

The following table describes the settings for the common message format fields.

Field	Description
Reset to Defaults button	Select this button to reset the settings back to the defaults.
Date	The default is 10.
Time	The default is 10.
Node	The default is 10.
Tagname	The default is 30.
Alarm Type	The default is 7.
Value	The default is 13.
Unit	The default is 4.
Message Length	The Message Length field allows you to specify the maximum number of characters that the printer can support. Valid entries are from 1-132. The default is 132.
Current Length	The Current Length field displays the number of characters that the printer currently supports.

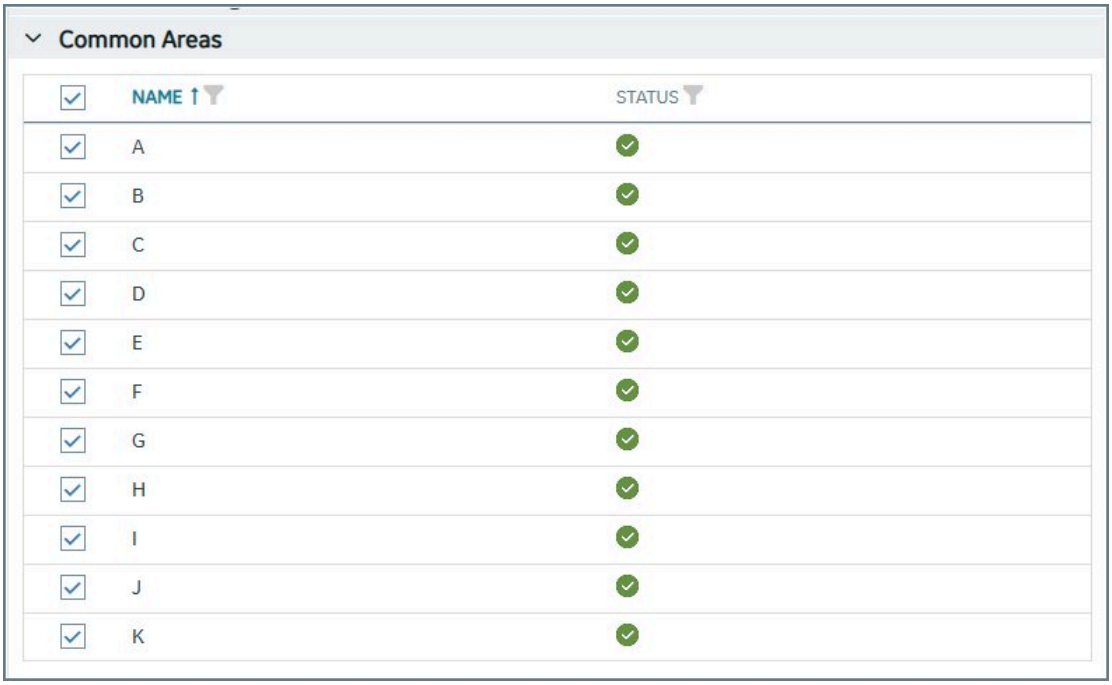
Common Alarm Areas Configuration

Configuration Hub allows you to manage your iFIX alarm area configuration from the Alarms panel.

Overview of Alarm Areas Configuration

To access Alarm Areas Configuration:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Configuration** and scroll to the end, and expand the section if needed. The Common Areas settings appear as shown in the following figure.



Overview of Alarm Areas Configuration

Select a check box to enable or disable an alarm area from the common configuration.

Alarm Clients

Configuration Hub allows you to manage your iFIX alarm clients from the Alarms panel.

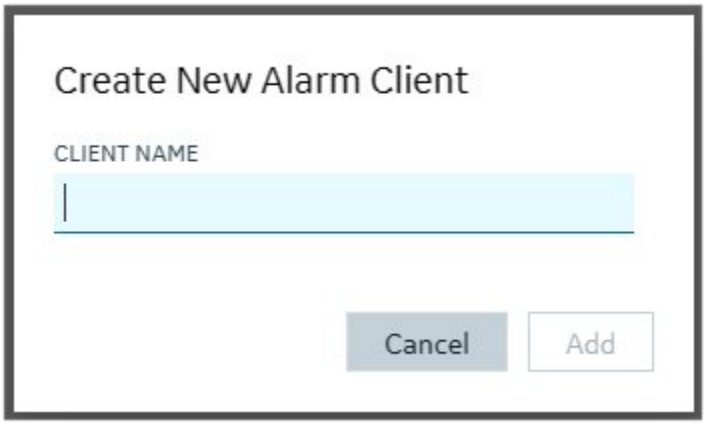
Access Alarm Clients

To access Alarm Services:

1. From the Navigation panel, select your node, iFIX project, and then **Alarms**.
2. Click **Clients**. The Alarm Clients settings appear as shown in the following figure.

Add an Alarm Client

To add an alarm client, click the plus (+) icon. The Create New Alarm Client dialog box appears. Enter a Client Name and click **Add**.



Project Settings

Overview of Project Settings

In Configuration Hub, you can manage iFIX project settings on the **Project Settings** panel. You can configure your project **Preferences**, **Failover**, and **Task Configuration** settings from this screen. You can manage multiple iFIX Projects through this panel.

Overview

After installing iFIX and Configuration Hub, the originally installed iFIX project displays the name **DefaultProject** in the Navigation panel. Any other iFIX projects created manually and started in iFIX, will also display in the Project List, but as a named project. You can choose to add a new projects *(on page 960)* though Configuration Hub by selecting the node name in the Navigation panel, clicking the plus (+) icon, and selecting **Create new iFIX Project**.

To manage project settings for a project, select your node name, the iFIX project, and then **Project Settings**. Most of the **Project Settings** that you can manage in Configuration Hub can also be found in the iFIX SCU app.

After you make your changes to Project Settings in Configuration Hub, you will need to apply them to the SCADA Server using the Save and Publish *(on page 981)* options. Restart iFIX after you publish, to see these new changes applied.

Important:
Any project settings that you edit, save, and publish in Configuration Hub, require a restart of iFIX to apply them to the SCADA node.

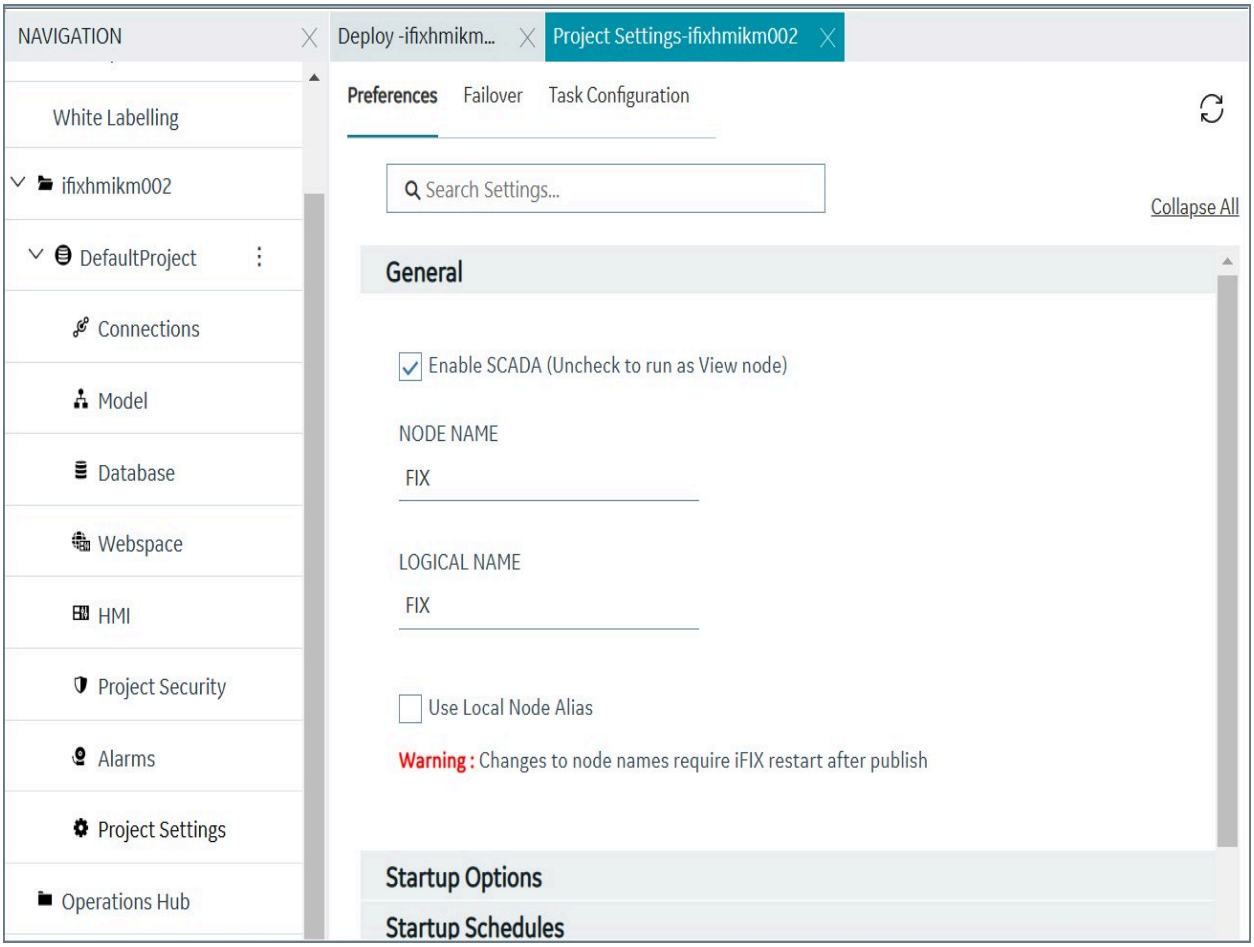
Troubleshooting

If you cannot start a project in Configuration Hub and you modified the iFIX node name in Configuration Hub, after you saved and published your changes, restart iFIX (as a service) through Configuration Hub. If the node was modified in iFIX, restart iFIX manually. For instance, restart from the iFIX Startup app. (One of these steps should help get the node name updated in project list and Project Settings in Configuration Hub.)

Accessing Project Settings

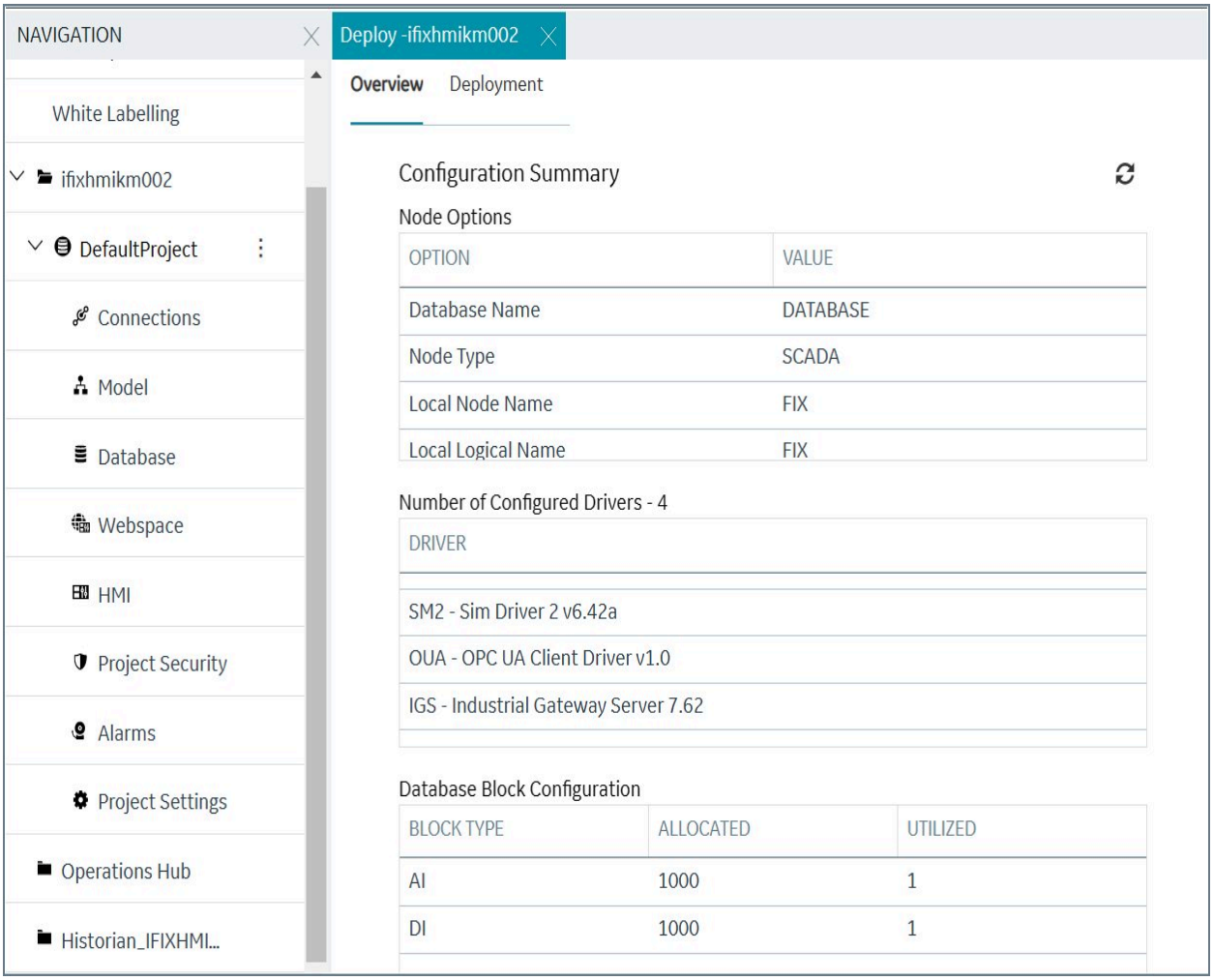
To access iFIX project settings in Configuration Hub:

- From the Navigation panel, select your node name, the iFIX project, and then **Project Settings**. The Project Settings appear as shown in the following figure.



Project Settings Summary Screen

To view the Project Summary settings, select your node name, and then the project name. For instance: Default Project. Click the Overview link (it displays by default) to view the project summary settings.

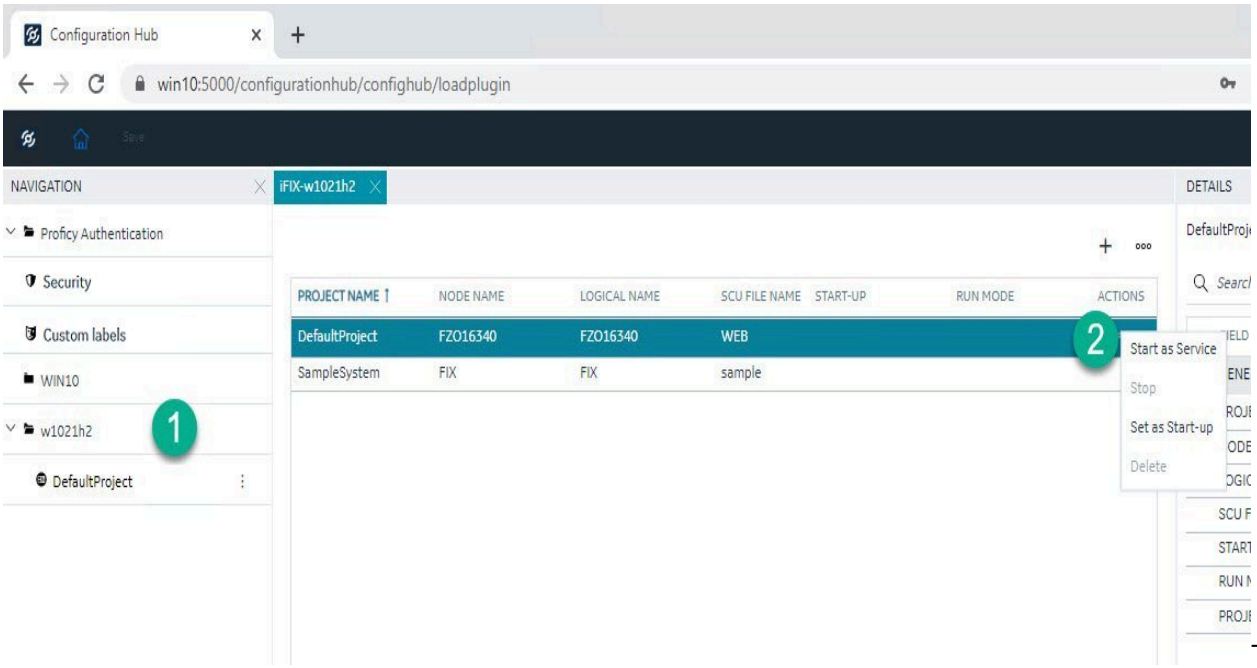


Starting and Stopping iFIX Projects

From the Project Panel in Configuration Hub, you can start and stop projects using the ellipsis (…) button in Project name list.

You cannot update or start iFIX with a specific Node Name from Configuration Hub. For instance, if iFIX Webspace sessions or iFIX Remote Desktop (terminal server) sessions are started, then the node name for the iFIX DefaultProject gets updated with the last run iFIX Project Node Name/SCU file. In this case, to start iFIX with a specific Node Name, you should manually start iFIX the traditional way, such as from the iFIX Startup app, instead of through Configuration Hub.

Start a Project as a Service

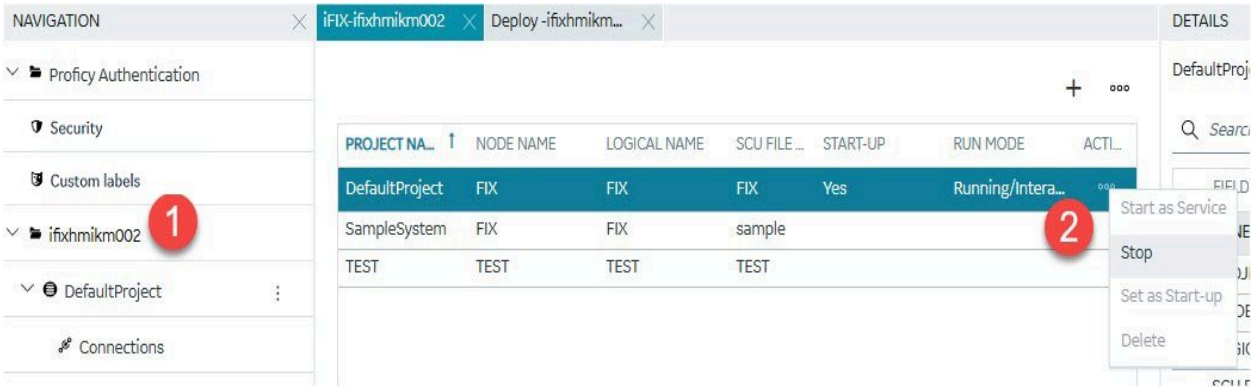


To start a project:

1. From the Navigation panel, select your node name to display the grid of project names.
2. Select the project name you want to start, and then select the ellipsis (…) button and then **Start as Service**.

   A message box appears asking if you want to continue.
3. Click Yes to proceed. You will then be prompted to save any open files before the process stops.

Stop a Project



To stop a project:

1. From the Navigation panel, select your node name to display the grid of project names.
2. Select the project name you want to stop, and then select the ellipsis (…) button and then **Stop**.

   A message box appears asking if you want to continue.
3. Click Yes to proceed.

Troubleshooting

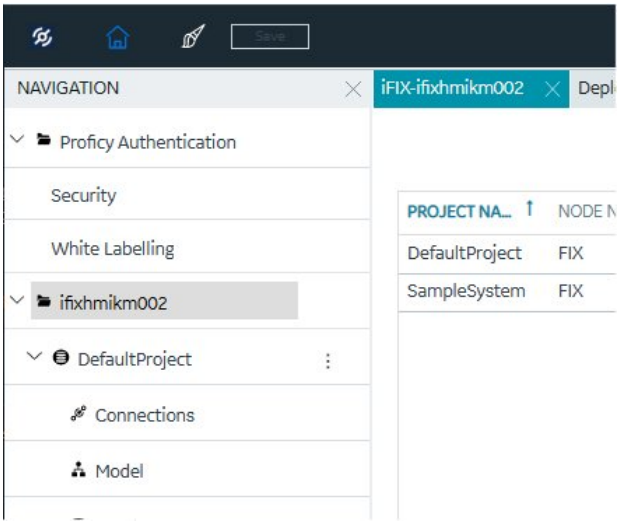
If you need to start iFIX with a specific node name other than the default, use the iFIX Startup app instead of Configuration Hub to start that instance.

Add a New Project

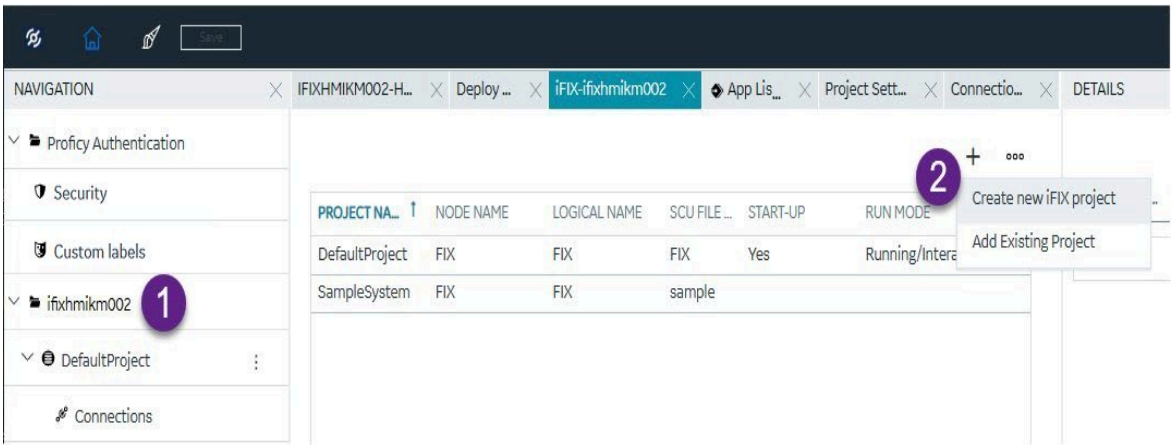
Use the following steps if you want to add a new project to your node.

Steps to Add a New Project

1. Configuration Hub, on the Navigation panel, click the node name. This action will open the Project Name panel.

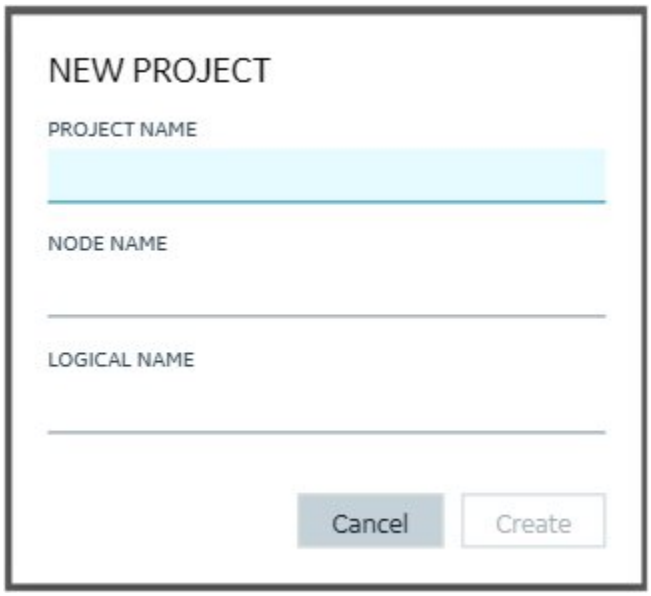


2. Click the + icon at the top of the grid, and select **Create new iFIX project**.



The New Project dialog box appears.

3. Enter a Project Name, Node Name, and Logical Name, as shown in the following figure.



4. Click **Create**.

   You should now be able to view the new project from within Configuration Hub or the standard iFIX SCU application.

5. Manually copy any additional driver files to the new project's PDB folder on the installed iFIX instance. For example, for IGS, copy the Fix.igs or nodename.igs file from PDB folder in the iFIX install path to the new project's PDB folder. This copy only needs to be done once when you create the new project.

> **Important:**
> If you do not copy the driver files, like the one for the IGS I/O Driver, you will not be able to later save and publish your driver updates from Configuration Hub.

If you get error or fail to create a new iFIX project from the Configuration Hub, and iFIX access control is enabled with iFIX is running a service, shut down iFIX and then create the new project.

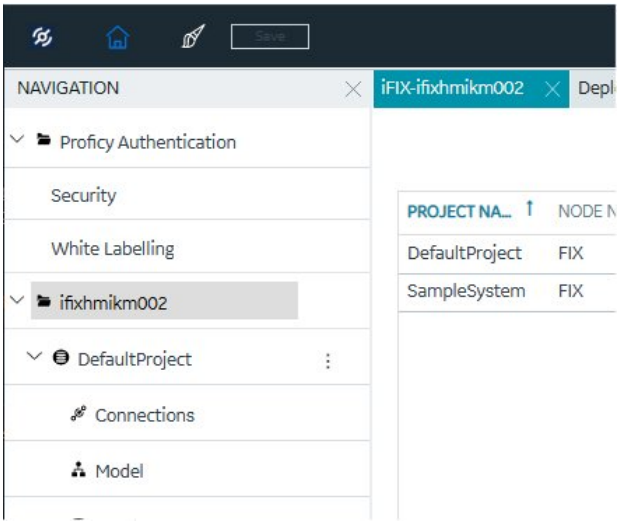
Troubleshooting

1. If you have issues publishing your driver changes to your new project, copy the driver files from PDB folder in the iFIX install path to the new project's PDB folder. For example, for IGS, copy the Fix.igs or nodename.igs file from PDB folder in the iFIX install path to the new project's PDB folder.
2. If you have issues creating a new project when iFIX is running with access control and enabled as a service, shut down iFIX and then create the new project. After you do that, you can start the project again and create, save, and publish any updated settings.

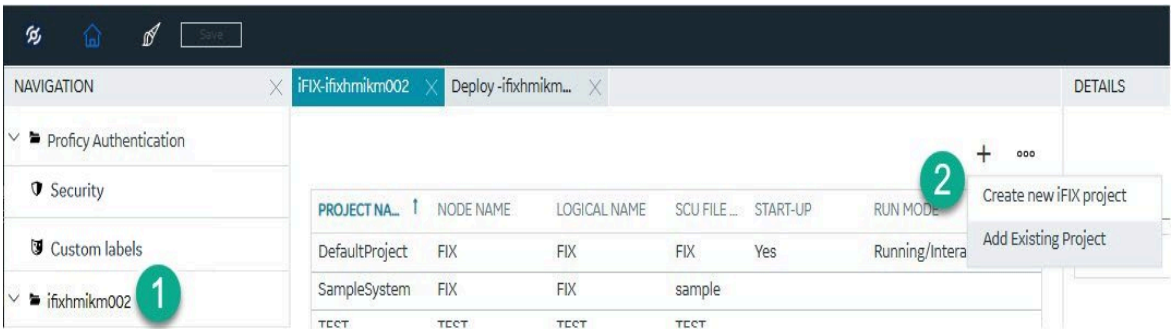
Add an Existing Project

Use the following steps if you want to add an existing project from another folder to Configuration Hub. Configuration Hub will recognize the new project after this is done.

1. Configuration Hub, on the Navigation panel, click the node name. This action will open the Project Name panel.

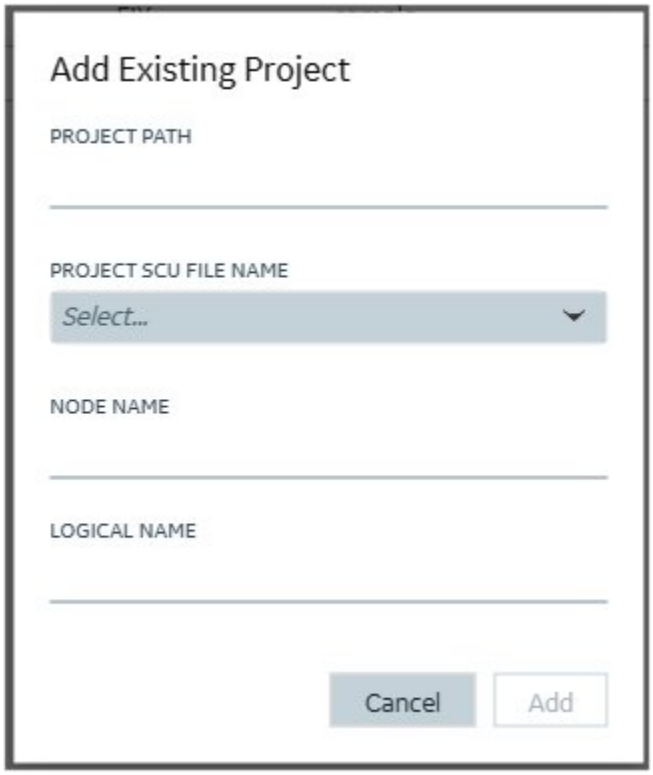


2. Click the + icon at the top of the grid and select **Add Existing project**.



The New Proejct dialog box appears.

3. Enter the Project Path, select the SCU file name, and then enter a Node Name and Logical Name, as shown in the following figure.



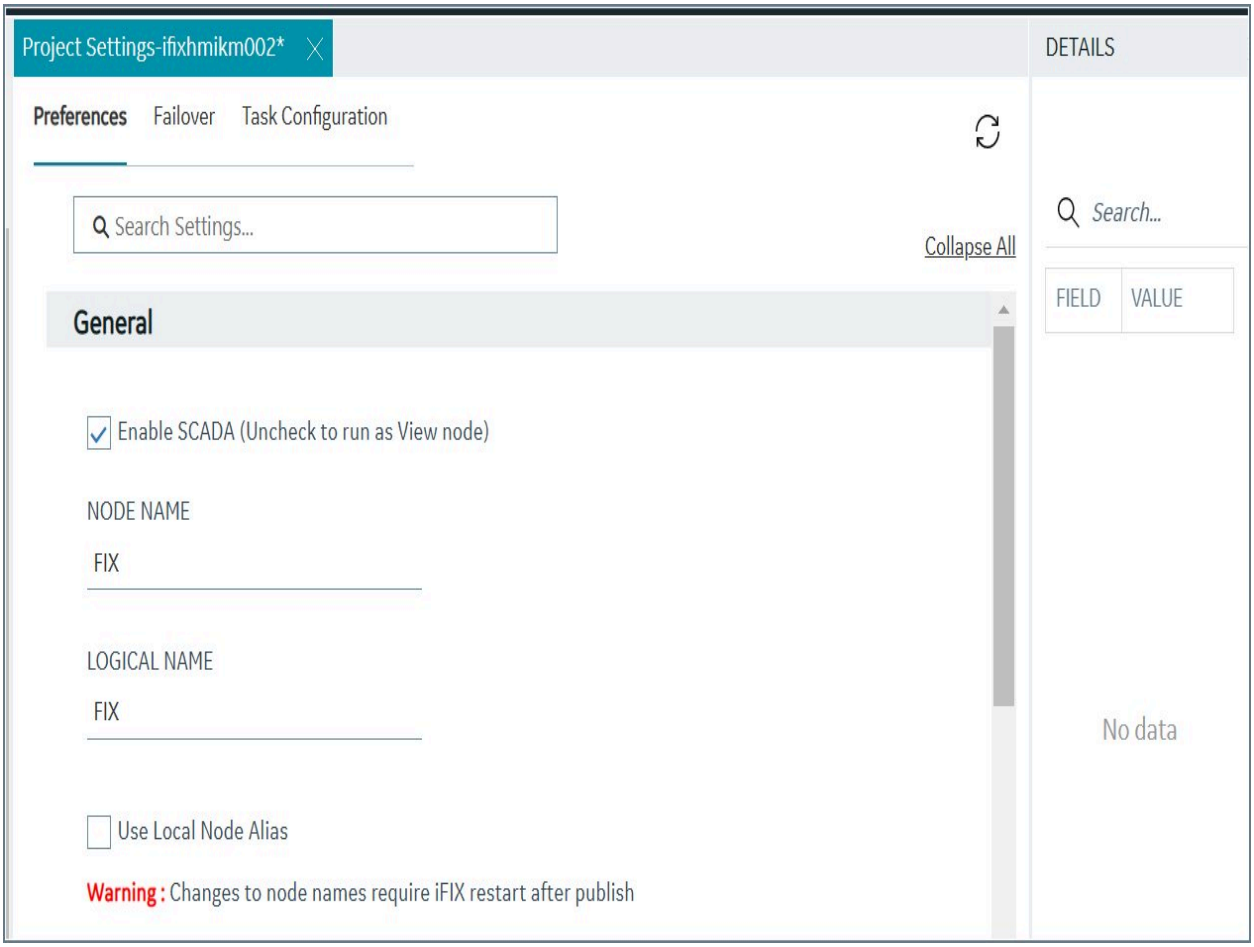
4. Click **Add**.

   You should now be able to view the existing project from within Configuration Hub.

General Settings

The General settings allow you to define configuration options that apply to the node you want to configure. You can specify the SCADA or View node preference, the node name, the logical name, and the local node alias.

From the Navigation pane, select your node, iFIX project, and then Project Settings. Next, click Preferences. The General project settings appear at the top if the list as shown in the following figure.



The following table describes the General settings you can configure.

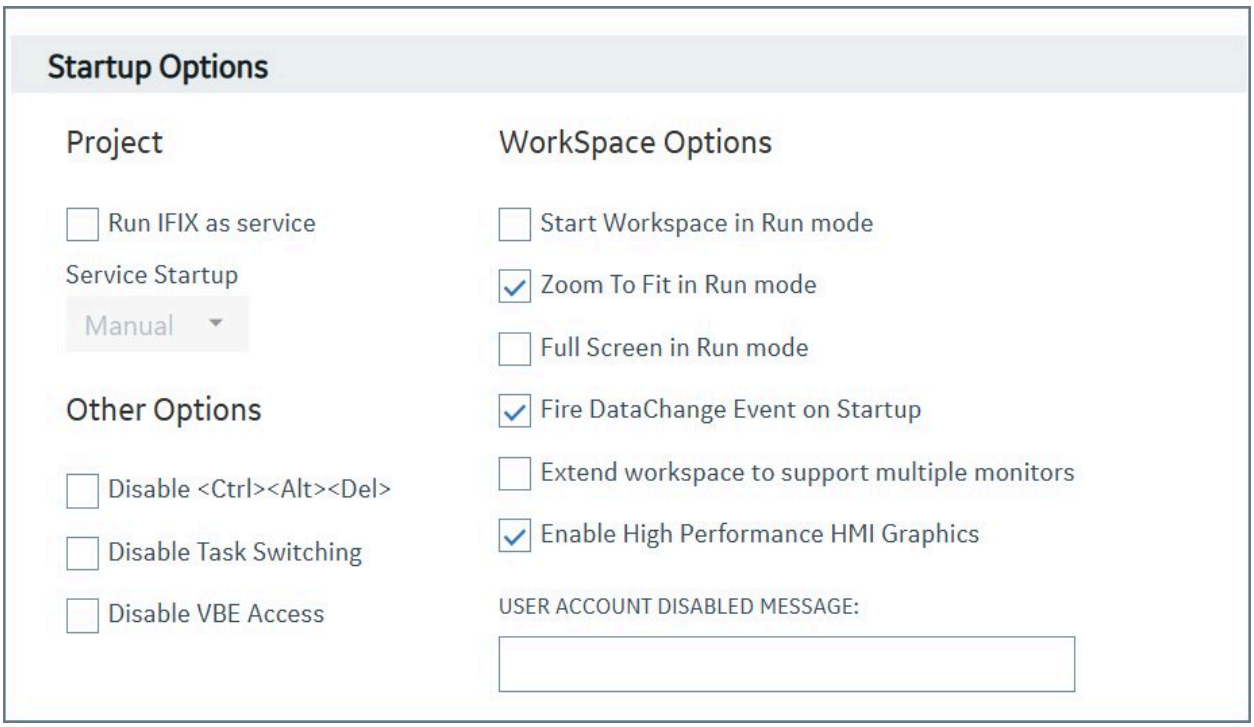
Field	Description
Enable SCADA (uncheck to run as View node)	Select this check box to use this node as a SCADA node. Clear the check box to use this node as a View node (iClient).
Node Name	Allows you to specify a unique local node name. Node names can be up to eight characters long. They can include alphanumeric characters, but must begin with a letter. Special characters cannot be used.

Field	Description
	Important: If modifying the iFIX node name here in Configuration Hub, after you save and publish your changes, you must restart iFIX (as a service) through Configuration Hub to view your applied changes. If the node name was modified in iFIX, and not displaying properly in this field, you must restart iFIX manually from iFIX Startup.
Logical Name	Allows you to specify a unique local node name to specify the name in your operating system's Registry. Node names can be up to eight characters long. They can include alphanumeric characters, but must begin with a letter. Special characters cannot be used.
Use Local Node Alias	Allows you to specify a unique local node name to specify the name in your operating system's Registry. Node names can be up to eight characters long. They can include alphanumeric characters, but must begin with a letter. Special characters cannot be used. You must be logged in as a user in the Administrators group to change the Local Node Alias.

Startup Options

The Startup Options let you define the initial settings you want to use when iFIX starts in run mode.

To access the Startup Options, from the Navigation panel, click your node, project, and then select Project Settings. Next, click Preferences and scroll to the Startup Options settings that appears second in the list. The Startup Options appear as shown in the following figure.



The following table describes the Startup Options that you can configure.

Field	Description
Run as iFIX Service	Allows you to configure iFIX to run as a service under Microsoft Windows when you start iFIX. iFIX continues to run as a service for the next user who logs on. To stop the service, stop iFIX. You must be logged in as a user in the Administrators group to configure this settings. Additionally, this check box is unavailable when iFIX is running.
Service Startup	Select one of the following: • Manual: Requires that you manually start and stop iFIX via the UI, on demand. • Automatic: Allows you to automatically start iFIX when Windows starts. This option is available only if you select the Run iFIX as a Service check box.

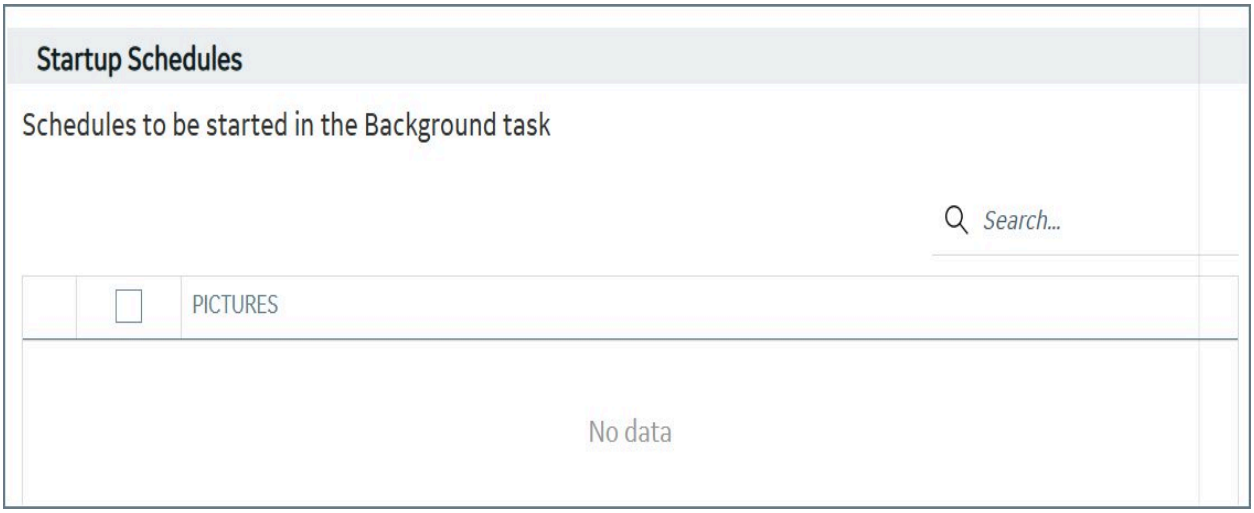
Field	Description
Disable <Ctrl><Alt><Delete>	Select this check box to disable the <Ctrl><Alt><Delete> key sequence at run-time, thereby restricting operators from accessing the Task Manager, changing their password, logging off, or shutting down the computer.
Disable Task Switching	Select this check box to disable run-time task switching through <Alt><Tab> and the Start button. **Note:** The Shift + F10 key macro does not work if you select this option.
Disable VBE	Select this check box to allow you to restrict access to the Visual Basic Editor at run-time in the iFIX WorkSpace. If access is not restricted, the editor appears when a compilation or run-time error occurs, allowing you to correct the error. When you restrict access, the iFIX WorkSpace suppresses the Visual Basic Editor even if an error occurs.
Start Workspace in Run Mode	Select this check box to indicate that the iFIX WorkSpace starts in the run-time environment. Clear this check box to indicate that the iFIX WorkSpace starts in the configuration environment.
Zoom to Fit in Run Mode	Select this check box to suppress the scroll bars and to show the entire picture in the current picture window in run mode. Only pictures using Enhanced Coordinates that are opened in Run mode will honor this setting. If you do not want to apply this setting to a specific picture, then a script change under the picture initialization code is required. For more information, refer to the ZoomToFit Method section in iFIX Automation Reference e-book.
Full Screen in Run Mode	Select this check box to display pictures in the run-time environment with the maximum screen space

Field	Description
	possible. When the iFIX WorkSpace displays full-screen in the run-time environment, the menu bar is hidden. The system tree and all toolbars are always hidden in this environment.
Fire DataChange Event on Startup	Select this check box to configure the Data Change event of an event object to fire only when there is new data after the initialization. Actions such as switching from the Configuration environment to the Run-time environment while an iFIX schedule is open will cause the DataChange event to trigger accordingly. If you select this option, iFIX fires the event when initializing the event object at the time you open a picture and switch to run mode. Clear this check box if you want events to fire only if the data source truly changes.
Extend Workspace to Support Multiple Monitors	Select this check box if you plan to use multiple monitors with your iFIX displays.
Enable High Performance HMI Graphics	Select this check box to create high performance graphics in iFIX pictures that use the High Performance color set and the high performance settings for shapes and picture creation. For more information, refer to the Creating High Performance Pictures e-book.
User Account Disabled Message	Specifies the message that appears from the Electronic Signature dialog box when a user account is no longer valid.

Startup Schedules

Startup Schedules can also be viewed from Configuration Hub. Startup Schedules display the schedules configured to automatically load in the background when the background task is started.

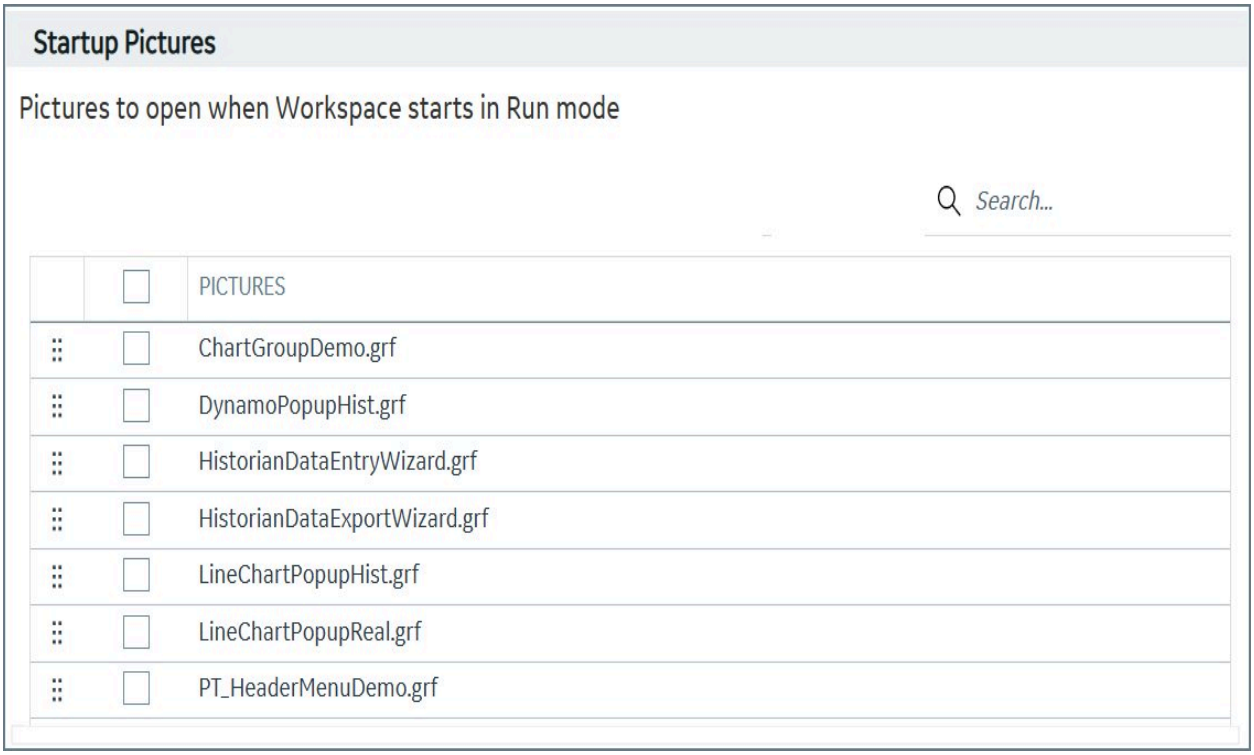
To access Startup Schedules, from the Navigation panel, click your node, project, and then select Project Settings. Next, click Preferences and then scroll to the Startup Schedules settings that appear third in the list. The Startup Schedules appear as shown in the following figure.



Startup Pictures

The Startup Pictures settings displays the pictures that you want to open automatically when the iFIX WorkSpace starts in the run-time environment.

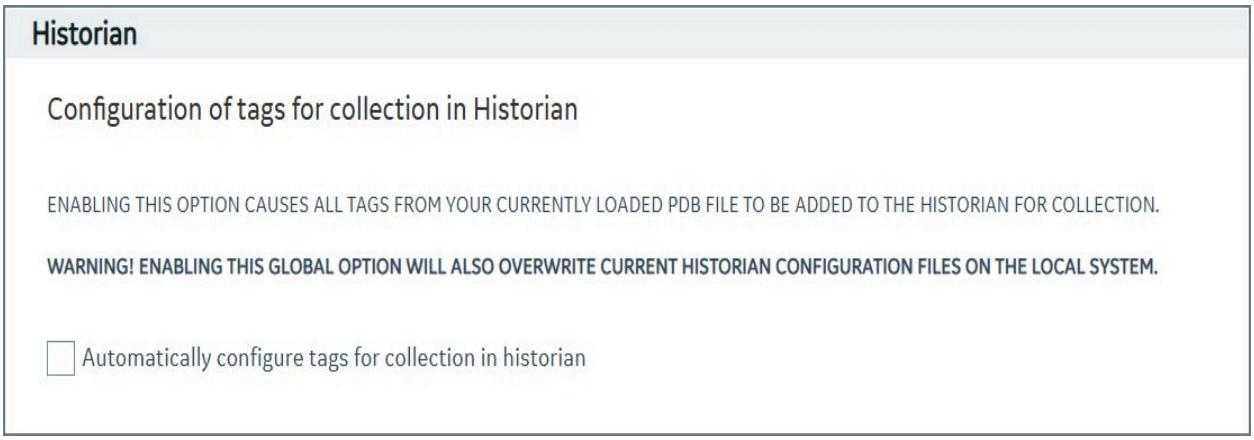
To access Startup Pictures, from the Navigation pane, select your node, iFIX project, and then Project Settings. Next, click Preferences and then scroll down to the Startup Pictures settings. The Startup Pictures appear as shown in the following figure. Select a check box to add that picture to the startup list.



Historian

From the Historian settings, you can choose to set whether you enable **Automatically configure tags for collection in Historian**, by clearing or selecting the check box.

From the Navigation panel, select your node, iFIX project, and then Project Settings. Next, click Preferences and then scroll to the Historian settings at the bottom of the list. The Historian settings appear as shown in the following figure.



Select this check box to enable collection of all database tags by Proficy Historian.

Enabling this option will add all tags from the currently loaded database to Historian for collection on the next reload.

SCADA Failover

SCADA Enhanced Failover settings can be configured and viewed from Configuration Hub. SCADA Enhanced Failover is the ability to define two SCADA nodes to function as one logical node. The logical node provides data and alarms to its clients even if one of the SCADA nodes becomes inoperable. When you start iFIX on both nodes, one SCADA will be your active node, and the other will be your standby node.

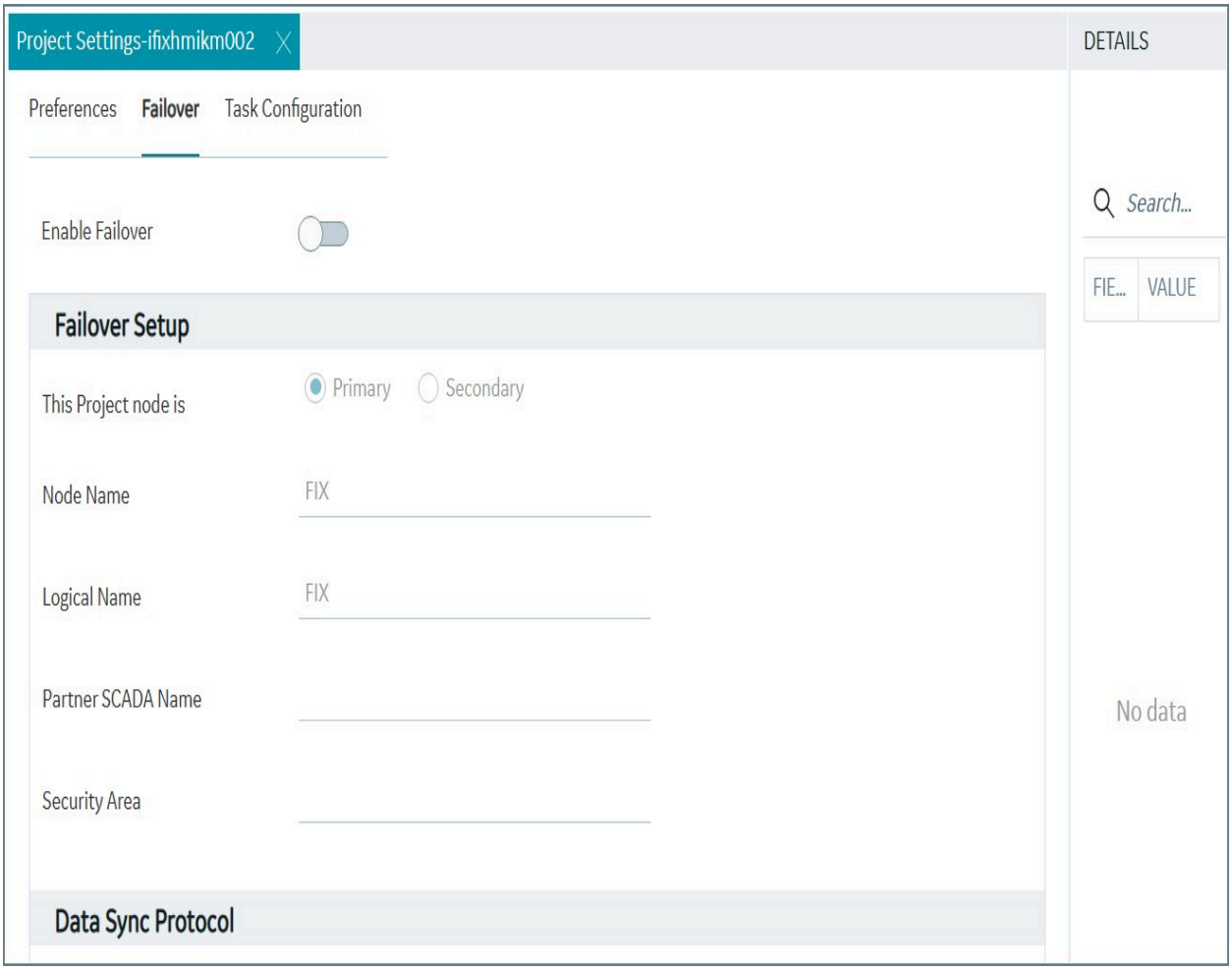
When managing Failover settings, be sure that you review Special Considerations for SCADA Enhanced Failover *(on page 305)* before you make any changes.

Note:

Be aware that iFIX SCADA Enhanced Failover is not the same as High Availability for Configuration Hub *(on page 110)*

For complete details on setting up SCADA Enhanced Failover, see the Enhanced Failover e-book.

To access Failover settings, from the Navigation panel, select your node, iFIX project, and then Project Settings. Next, click Failover. The Failover settings appear as shown in the following figure.



The following tables describes the Failover settings you can manage or view.

Table 14. Failover Setup

Field	Description
Enable Failover	Use the slider to enable Enhanced Failover on this SCADA node.
Project Node Designation	Select whether the node is the Primary or Secondary node in the Enhanced Failover configuration. For more details on setting up SCADA Enhanced Failover, see the Enhanced Failover e-book.

Table 14. Failover Setup (continued)

Field	Description
Node Name	Allows you to specify a unique local node name to specify the name in your operating system's Registry. Node names can be up to eight characters long. They can include alphanumeric characters, but must begin with a letter. Special characters cannot be used.
Logical Name	Allows you to specify a logical node name used for configuring redundancy. Node names can be up to eight characters long. They can include alphanumeric characters, but must begin with a letter. Special characters cannot be used.
Partner SCADA Name	Enter the name of the partner SCADA node.
Security Area	If using security areas in iFIX, enter the letter associated with the security area assigned to administrators of your Enhanced Failover configurations. Only one security area is supported for Enhanced Failover.

Table 15. Data Sync Protocol

Field	Description
Protocol	Select the type of protocol you want to use: TCP or UDP. TCP is the default.
Transport Enable	Select to enable Data Sync Transport, where you configure you network preferences for data transport.
MAC Address	This field is for viewing purposes only. The Media Access Control (MAC) address represents a

Table 15. Data Sync Protocol (continued)

Field	Description
	unique identifier for the selected network adapter on the local computer.
IP Address	This field is for viewing purposes only. The Address is the IP address for the selected network adapter on the local computer.
Partner's IP Address	Enter the IP address of the partner SCADA node. If you are configuring the primary SCADA, this IP address is the IP address of the corresponding network adapter on the secondary SCADA node. If you are configuring the secondary SCADA, this IP address is the IP address of the corresponding network adapter on the primary SCADA. The IP address that you enter should be a static or fixed IP address. Do not use DNS-assigned IP addresses for Enhanced Failover.
Message Reply Count	The default setting is 3.
Bandwidth Limit (MBs)	The default setting is 0.
Watchdog Time	The default setting is 1.
Watchdog Timeout	Enter a value, in seconds, indicating how long you want ScadaSync.exe to wait before determining that this transport is not connected. The default setting is 4 seconds.
Message Timeout	Enter a value, in seconds, indicating how long ScadaSync.exe waits for an acknowledgement from the partner SCADA (indicating that a data packet is received successfully). If an acknowledgement is not received by this time-out period, the retry logic initiates according to the value of the Message Retry field.

Table 15. Data Sync Protocol (continued)

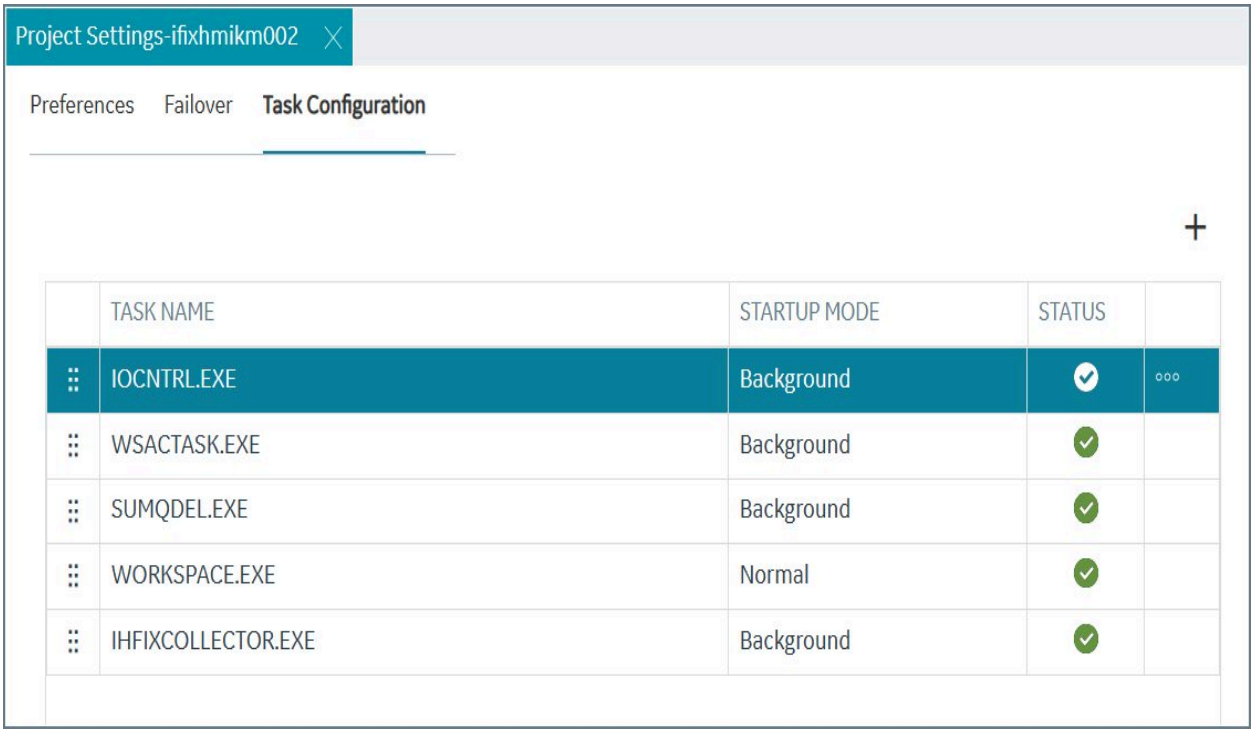
Field	Description
	When a message times out, the SCADA Sync Monitor (a diagnostic program in iFIX) displays a message on the debug output screen. On this screen, the timer will show up as milliseconds. For more information on this screen in the SCADA Sync Monitor, refer to the Debug Log for Troubleshooting section. The default setting is 2 seconds.

Task Configuration

From the Task Configuration, you can manage the tasks for automatic start-up, and whether they start as normal tasks or in the background.

The tasks listed in this dialog box start when you start iFIX. For example, if you always want to use I/O Control when you start iFIX, add a task for IOCNTRL.EXE to the top of the configured task list.

In the Navigation panel, select the node, project, and then **Project Settings**, and then click **Task Configuration**. The following figure shows an example of the Task Configuration screen.



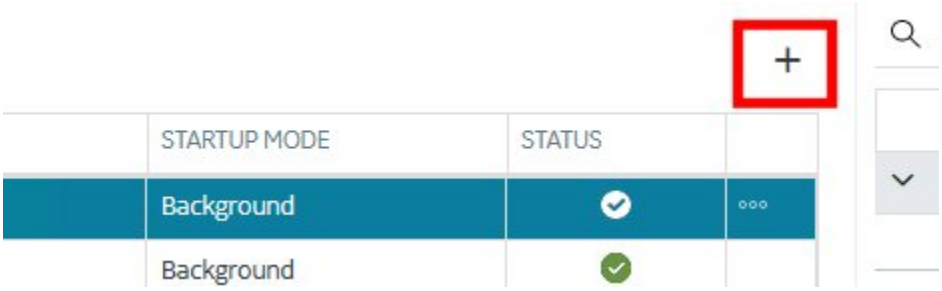
Command line parameters can also be added for each task. iFIX executes the tasks in the same order as they appear in the configured task name list from the Details panel. Drag-and-drop tasks to move items up and down in the list.

If you run iFIX as a service, the tasks listed in the task list also start as a service.

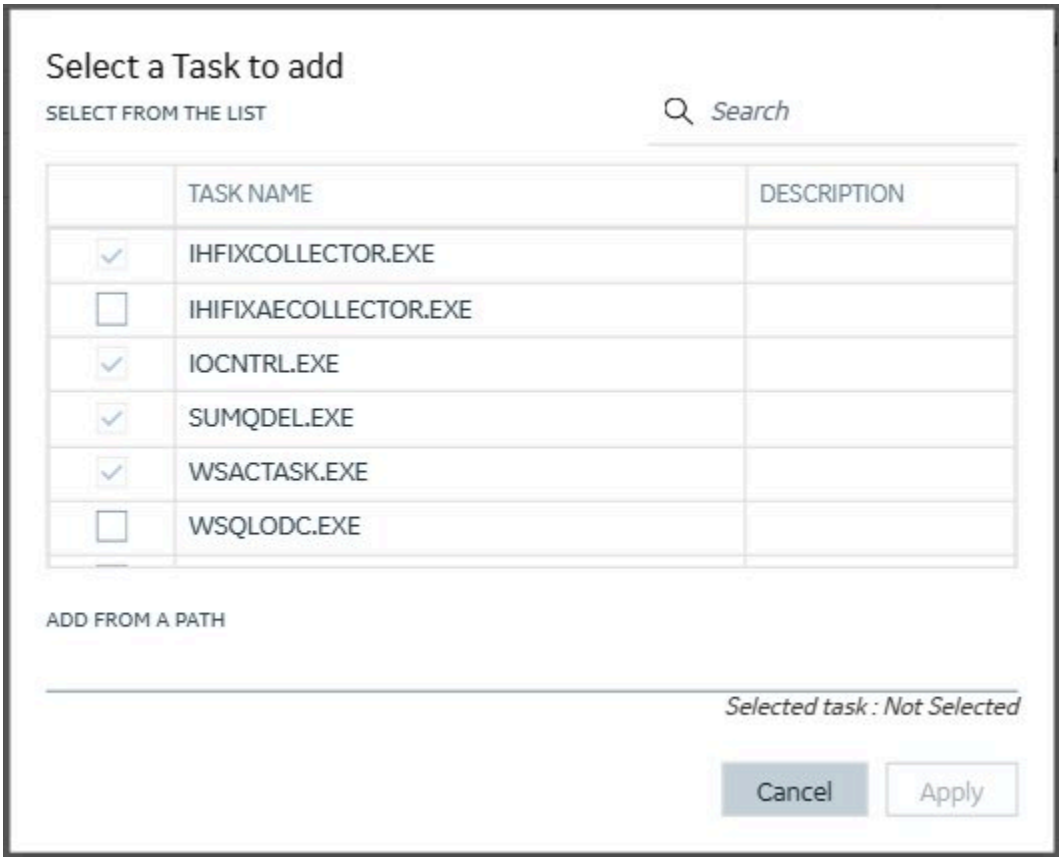
Note:
It is not recommended that you run Workspace.exe in the SCU task list when iFIX is running as a service.

Add a Startup Task Settings

To add a new task, click the plus (+) icon at the top of the task list.

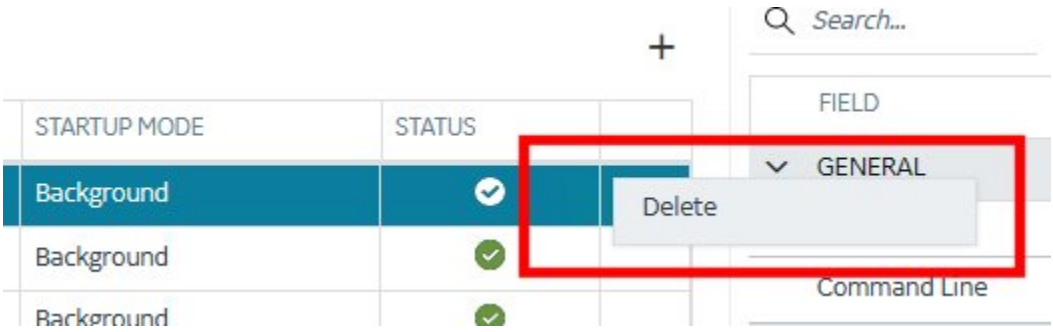


The Select a Task to Add dialog box appears. Select the executable from the list that you want to add on iFIX startup. The files that appear in this list are from the iFIX/LOCAL folder.



Delete a Startup Task

To remove a task from the list, select the task from the configured task name list, click the ellipsis (..) at the end of the row, and then click Delete.



Task Configuration Settings

The following table describes the Task Configuration settings you can configure on the Details panel.

Field	Description
Startup Mode	Select the mode for startup:

Field	Description
	• Normal: Allows you to start the task with its window open. • Minimize: Allows you to start the task with its window minimized. • Background: Allows you to start the task as a background task.
Command Line	Allows you to add any command line parameters associated with the specified executable file. For example, you can define command line parameters for SAC (WSACTASK.EXE), I/O Control (IOCNTRL.EXE), and selected iFIX applications. For some tasks, you can enter the text for the command directly into the Value field. For other pre-defined ones, you need to select a task option to populate the Command-line field. For example, when adding an iFIX collector to the task list of an iFIX project from within Configuration Hub, you need to select the options such as Run as a Service. Otherwise, the command line is created with a dangling = sign, and does not start. **Important:** If you need to pass in a value associated with the command line, be sure that you either enter it in the Value field, or select a check box(es) from the Task Options to populate the Command line field. To add command line parameters to third-party executables, check the application's reference documentation for valid entries.
Task Options	These are options are specific to the file selected.

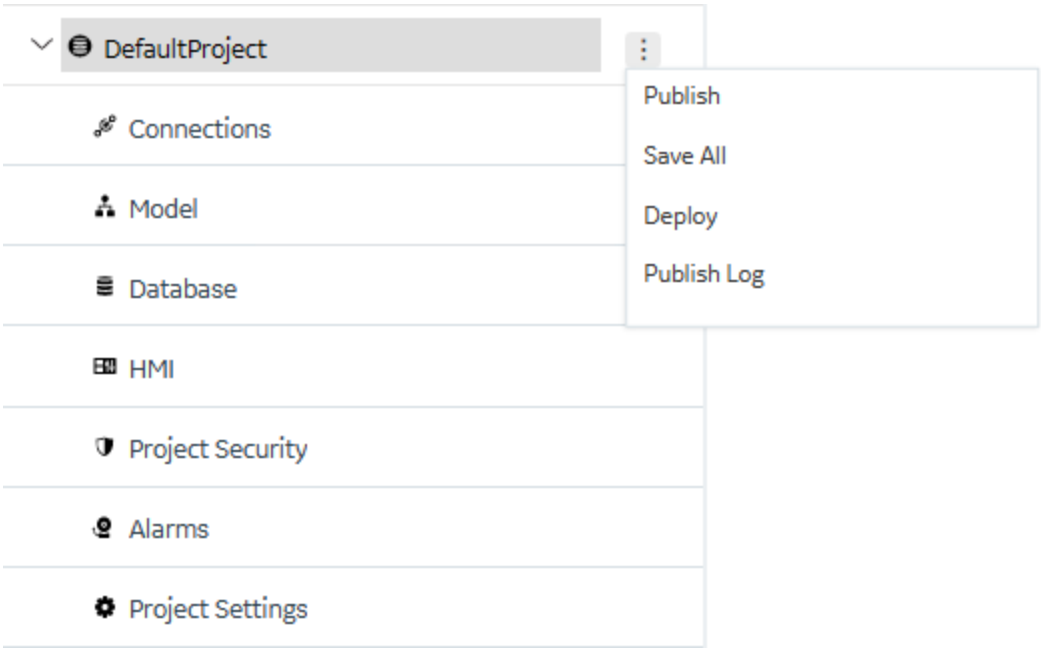
Deployment

Project Deployment

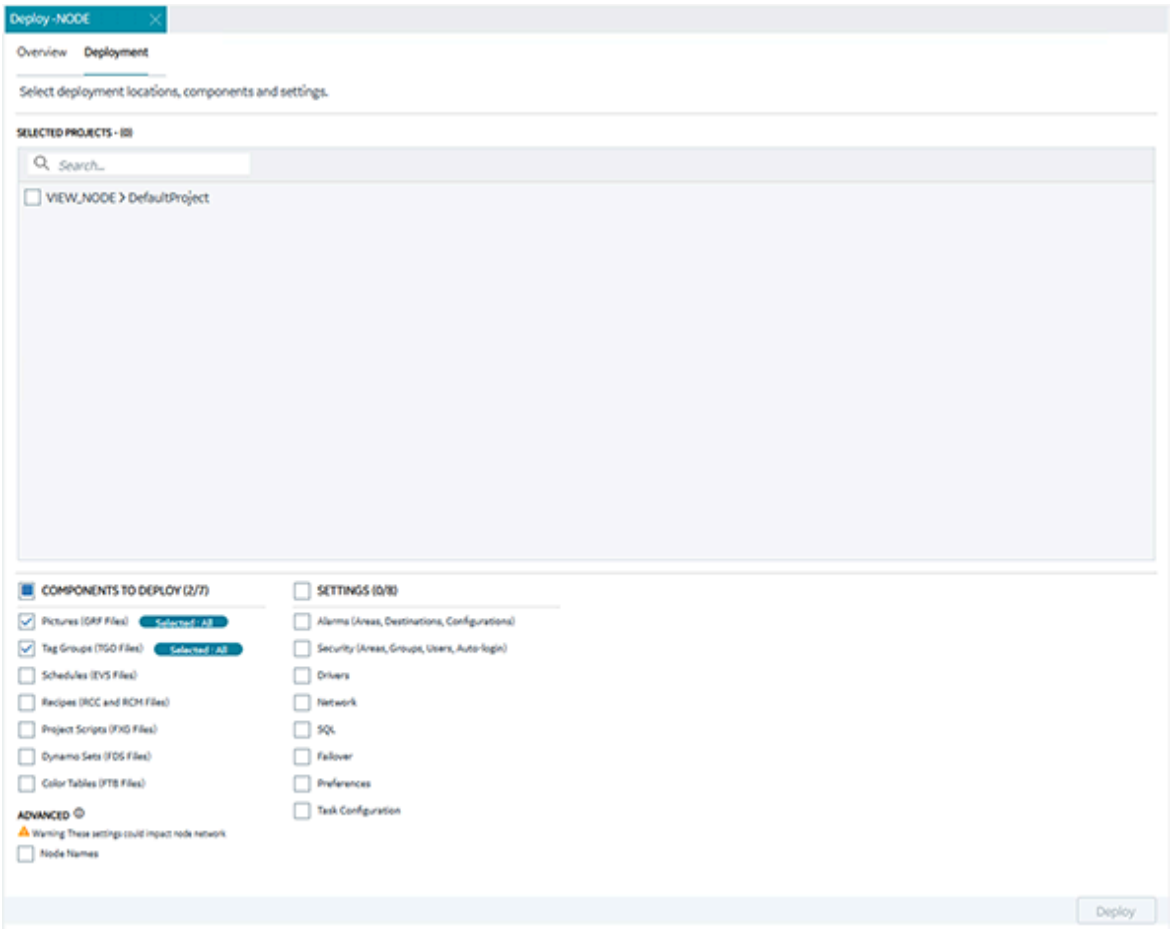
Project Deployment provides the ability to deploy (copy) key HMI components and/or settings between iFIX SCADA or View nodes. This feature allows a user to develop components/settings (for example: picture files, alarm areas, security groups, and so on) on one node and then easily transfer them to multiple nodes, eliminating the need to connect to each one to make local updates, or to employ shared folders as a means of distribution. To use this feature:

- The nodes must be running iFIX 2023 or later and be registered to a Configuration Hub server.
- The user must be a member of the Project Administration group (scada.project.admin) in Configuration Hub.

1. Log into Configuration Hub.
2. From the **NAVIGATION** pane, click the chevron for the iFIX node from which you want to copy (the “source” node) the components and/or settings.
3. Click the vertical ellipsis. From the menu that appears, click **Deploy**. This will open the **Deploy** panel.



4. The **Selected Projects** section will list all nodes to which components and/or settings can be deployed (the “target” node). Enable the checkboxes to select the “target” node(s). Any nodes not listed here may not be running the required version of iFIX or be registered to a Configuration Hub server.



5. Use the checkboxes for **Components To Deploy**, **Settings** and **Advanced** to enable the selection of specific items to be deployed to the target node. **Note**: The **Advanced** section contains only one item, **Node Names**. Exercise caution when selecting this item, as nodes on the same network must have unique names.
6. Within **Components To Deploy**, the items **Pictures** and **Tag Groups** are selected by default as they are the most common items deployed between nodes. For these two components, when selected, a **Selected:** button will indicate how many specific items are currently selected. Click the button to refine the list of specific items to deploy. A selection window will appear (for example, **Select Pictures to deploy**).

> **Important:**
> The deployment of pictures from subfolders is not supported. Only pictures in the **PIC** folder can be deployed. Be aware that while you can also select and deploy tag groups from one iFIX machine to another, the tag groups do not show up under the HMI tab. You will only see .GRF files under the HMI tab. Other files like .FXG and .TGD files, even though they can be deployed, will not display under the HMI tab.

7. Use the check boxes to select the specific items to be deployed. Click **Add**.

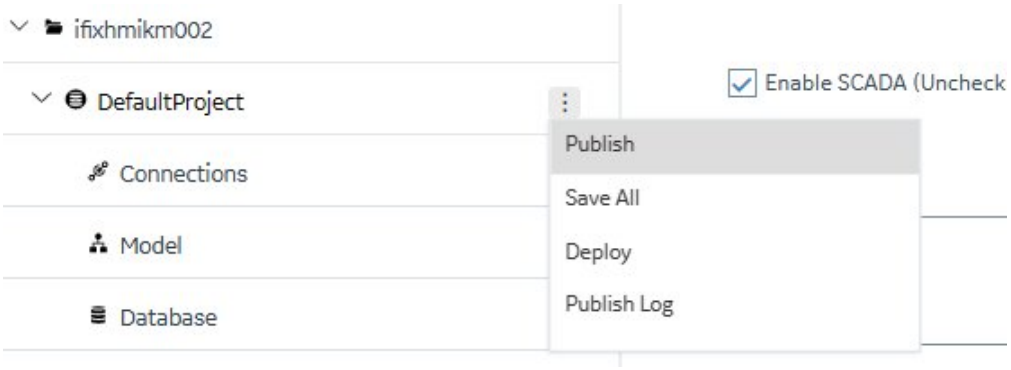
> **Note:**
> When you choose **Preferences**, be aware that only iFIX User Preferences are included. It does not include Node and SCU local startup settings.

> **Important:**
> The following **Settings** cannot be deployed to View nodes (only to SCADA nodes): **Drivers** and **Failover**.

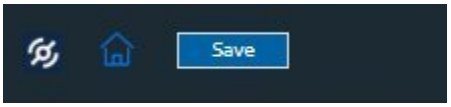
8. Once all items have been chosen, click **Deploy**.
9. Once the deployment has completed, click **Close**.
10. To see the items copied on the target node, select the target node from the **NAVIGATION** pane. Expand the node by clicking the chevron. Click the name of the panel into which you deployed the component/setting (for example, if you deployed a picture, select **HMI**). Click the tab for the panel in the main viewing area of the interface. Click the refresh icon (icon image to be inserted here) to update the list. Note that the new components/settings have been deployed to the target node, but are in an unpublished state.
11. For the new components/settings to take effect, they must be published on the target node.

Save and Publish

When configuring an iFIX node in Configuration Hub, access the **Publish** and **Save All** settings from the iFIX project name. The following figure shows an example of this menu.

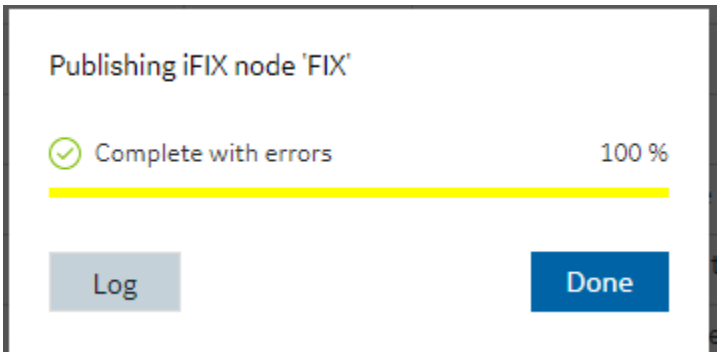


There is also a Save button available to save changes locally (but not publish them), from whereever you are in the Configuration Hub application.



For example, any changes in the Database panel must be saved before they are applied. If you do not want to save changes you have made, close the panel and choose not to save. An asterisk (*) appears in the panel tab when there are unsaved changes. Save is also used when editing a type, but the majority of operations in the Model tab are applied with no saving required.

Changes made in Configuration Hub for iFIX nodes do not update the running system until the changes are published. Until then, any changes are kept in a separate directory on the node being configured. When you are ready to apply the changes to the running system, click the Publish button to push the changes over to the server.



Note:
When Publishing, the Progress Bar does not update quickly and may take a while to complete. The Publish operation may take a while depending on the number of tags being published to the active iFIX node. Please wait for the Done indication.

You can discover unpublished changes in each panel via the status column in the panel's respective grids. Configured items are either in Published, Unpublished, or Modified state.

When publishing, you will be prompted to proceed and will see the progress of the publish. While publishing from one browser session, no other browser sessions are allowed to publish. Once publish has completed you will be able to download and view the results of the publish in a log file.

Note:
It is recommended that you only perform one publish operations at a time.

The log file reports the results and contains sections for Unpublished updates, modified updates and deleted update results.

During a publish, depending on your system and other factors, your publish may Fail completely (for example if the connection is lost to a the SCADA), Succeed, or be Complete with Errors. When partially successful, the log file will be the best source to determine what did not publish fully.

Chapter 5. CIMPLICITY

Overview

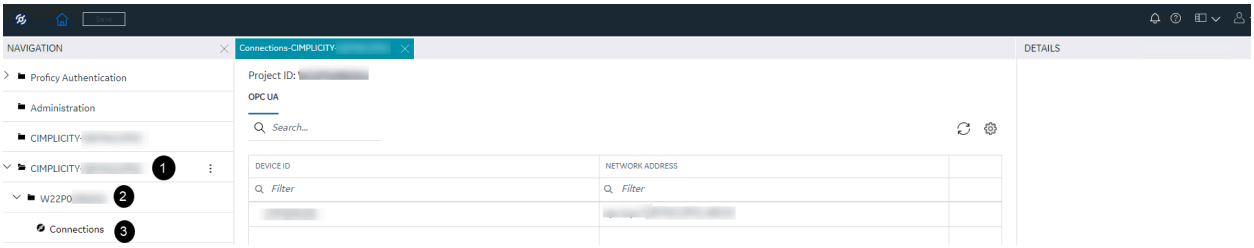
Overview of CIMPLICITY in Configuration Hub

Configuration Hub allows you to configure your Proficy products all together in one place, and access and configure them from anywhere. You can manage multiple Proficy products, including CIMPLICITY, from within Configuration Hub. For instance, Proficy Authentication, Operations Hub, and Historian.

After registering CIMPLICITY plug-in with Configuration Hub, you can log in to Configuration Hub, either using the desktop shortcut on the Configuration Hub machine desktop, or from the CIMPLICITY Workbench. For more information on registering the plug-in, see About Registering the CIMPLICITY Plug-in *(on page 987)*.

The CIMPLICITY plug-in appears in the Navigation pane, along with its associated projects on the left-side panel as shown in the following figure.

> **Note:**
> To access the plug-in, you must have the **SCADA.COMPUTER@[NodeName].$CONFIGSECGRP** scope published to Proficy Authentication. By default, all the needed scopes are added to the ch_admin user.



Marker	Description
1	CIMPLICITY Node/ computer registered with Configuration Hub and Proficy Authentication.
2	Project associated to the CIMPLICITY node.
3	Devices associated to the project.

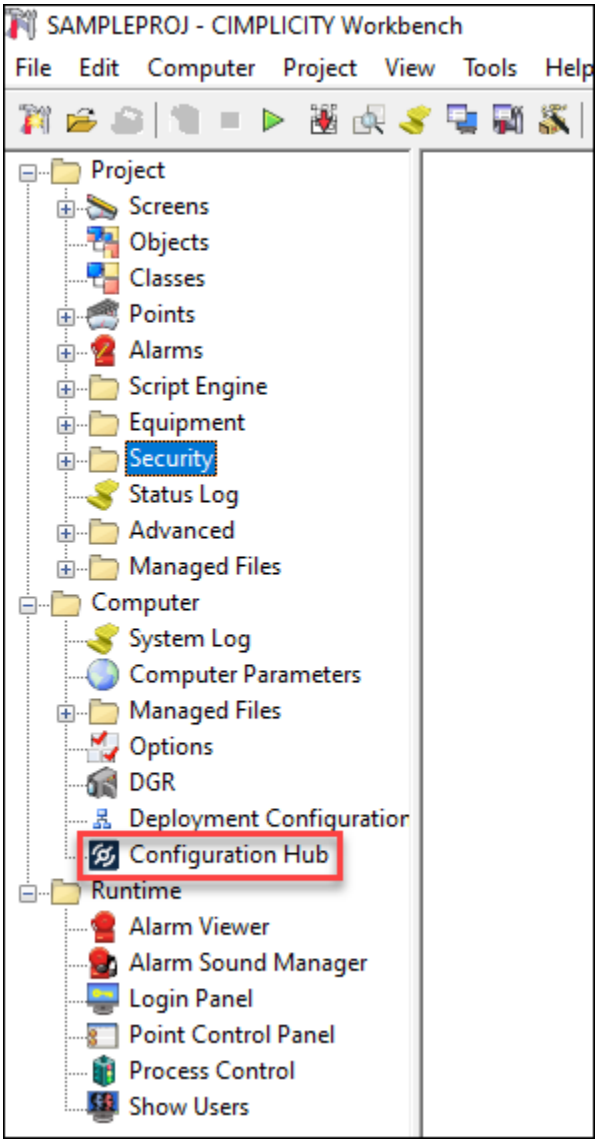
Marker	Description
	Note: **Connections** is displayed only if a Project is configured with devices. You can click **Connections** to browse *(on page 1001)* devices and create *(on page 1008)* points.

Access Configuration Hub from CIMPLICITY

After you egister CIMPLICITY with Configuration Hub *(on page 987)*, you can access the Configuration Hub within CIMPLICITY Workbench, or from the desktop of the Configuration Hub machine, using the Configuration Hub shortcut .

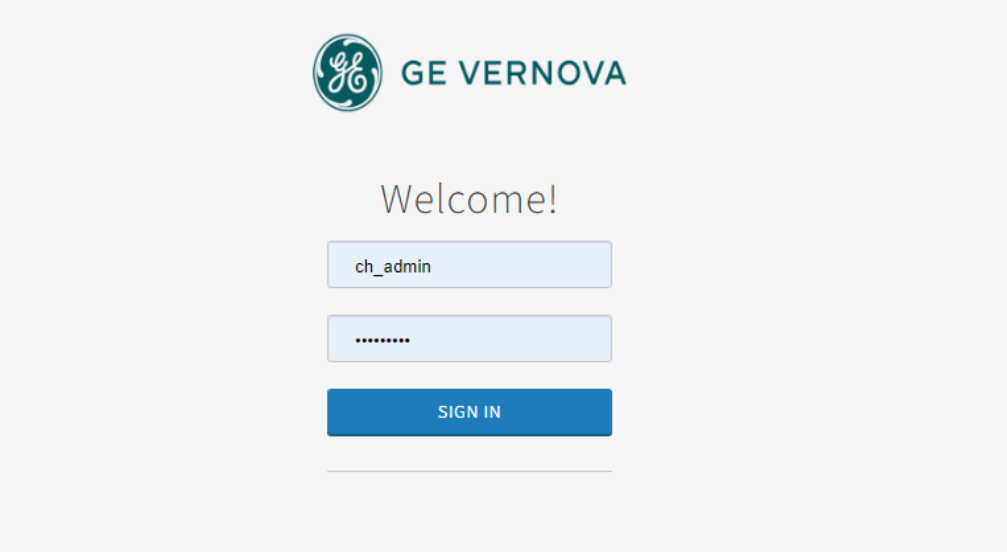
To access Configuration Hub from CIMPLICITY, do the following:

1. Open a project in **CIMPLICITY Workbench** as needed.
2. In the top-level folders, click and expand **Computer**.



3. Double-click Configuration Hub.

   The CIMPLICITY Proficy Authentication login page appears.



4. Log in using ch_admin as the user name and your Proficy Authentication secret as password. After a successful authentication, the Configuration Hub page appears.

You can start to use the plug-in to browse your CIMPLICITY projects, start or stop the projects, browse devices like OPC UA, and MQTT, and create SCADA points.

Registration

About Registering the CIMPLICITY Plug-in

What is a CIMPLICITY Plug-in?

A CIMPLICITY plug-in with Configuration Hub represents a CIMPLICITY server node. Using the CIMPLICITY plug-in, you can browse your CIMPLICITY project's OPC UA devices, and MQTT devices in Configuration Hub, which operates as a web-based application.

Configuration Hub allows you to register one or more CIMPLICITY nodes as plug-ins. To ensure secure interaction between Configuration Hub and a CIMPLICITY node, Proficy Authentication *(on page 135)* is used. Proficy Authentication provides identity-based security for applications and APIs. It supports open standards for authentication and authorization, including Oauth2. Before you use Proficy Authentication with CIMPLICITY, there are a few more steps you need to follow after registering; see the Best Practices and Limitations section in the CIMPLICITY online help to understand the steps and to consider some of the limitations.

Scopes Required to Access CIMPLICITY Plug-in in Configuration Hub

To access the plug-in, you must have the **SCADA.COMPUTER@[NodeName].$CONFIGSECGRP** scope published to Proficy Authentication. By default, all the needed scopes are added to the ch_admin user.

Supported Setup for CIMPLICITY Plug-in Registration

Component	Version
CIMPLICITY	2024
Configuration Hub	2024
Proficy Authentication	2024

Note:
If you are using a previous version of Proficy Authentication and Configuration Hub, kindly upgrade to version 2024.

Supported Types of CIMPLICITY Plug-in Registration

- CIMPLICITY is installed on one machine, while Configuration Hub and Proficy Authentication are installed on another machine, provided that both CIMPLICITY and Configuration Hub are using the same Proficy Authentication.
- CIMPLICITY, Configuration Hub, and Proficy Authentication are installed on three different machines. Provided that both CIMPLICITY and Configuration Hub are using the same Proficy Authentication.
- CIMPLICITY, Configuration Hub, and Proficy Authentication are installed on the same machine.

If you have decided to follow the central registration method to register CIMPLICITY plug-in in Configuration Hub, before you begin with the registration, see About Registering the CIMPLICITY Plug-in *(on page 987)*.

CIMPLICITY Plug-in Registration Use Cases

The following use cases provide detailed information on the different registration methods. You can use these uses cases as a reference to decide on the registration method.

First time Install: CIMPLICITY, Common components like Configuration Hub, and Proficy Authentication (Version 2024 or higher)

Scenario	Tasks to Perform
Common components installed before CIMPLICITY.	Perform install time registration during the CIMPLICITY installation. **Note:** If you skip providing Configuration Hub and Proficy Authentication details during the installation, then perform central registration *(on page 987)* after installing CIMPLICITY.
Common components installed after CIMPLICITY installation.	Perform central registration *(on page 987)* after installing CIMPLICITY.

CIMPLICITY Upgrade from Version 2023 to 2024 or higher version

Important:
To upgrade your previous versions of CIMPLICITY, you must uninstall the previous version first and then install the latest CIMPLICITY, that is 2024 or later. If you have registered a CIMPLICITY plug-in in Configuration Hub, you must first unregister the plug-in and then uninstall the existing version of CIMPLICITY. For more information on how to unregister a plug-in from Configuration Hub, refer to the Unregister CIMPLICITY Plug-in from Configuration Hub section in the CIMPLICITY 2023 online documentation.

Scenario	Tasks to Perform
Common components already upgraded to version 2024 or higher.	Perform install time registration during the CIMPLICITY upgrade, that is while installing CIMPLICITY 2024, after uninstalling the previous version of CIMPLICITY. **Note:** If you skip providing Configuration Hub and Proficy Authentication details during

Scenario	Tasks to Perform
	the upgrade, then perform central registration *(on page 987)* method after the installing the latest CIMPLICITY.
Common components are installed later with version 2024 or higher.	Perform central registration *(on page 987)* after installing CIMPLICITY.
Common components installed but not upgraded to version 2024 or higher.	**Important:** Upgrade common components to version 2024 or higher.

CIMPLICITY Unregistration

Scenario	Tasks to Perform
CIMPLICITY registered with version 2024 common components or higher.	Unregister CIMPLICITY centrally from Configuration Hub. Unregister CIMPLICITY plugin *(on page 1014)*.
CIMPLICITY of version 2023 (registered conventionally) to common components of version 2024 or higher.	Unregister CIMPLICITY conventionally. Kindly refer to the CIMPLICITY Plug-in Registration with Configuration Hub section in the CIMPLICITY 2023 online documentation

Pre-2024 CIMPLICITY Registration

Scenario	Tasks to Perform
Older version of CIMPLICITY registration and unregistration with common components of version 2024 or higher.	Follow the conventional process for registration and unregistration. Kindly refer to the CIMPLICITY Plug-in Registration with Configuration Hub section in the CIMPLICITY 2023 online documentation.

Migration of Common Components (Version 2024 or later) Post-Registration

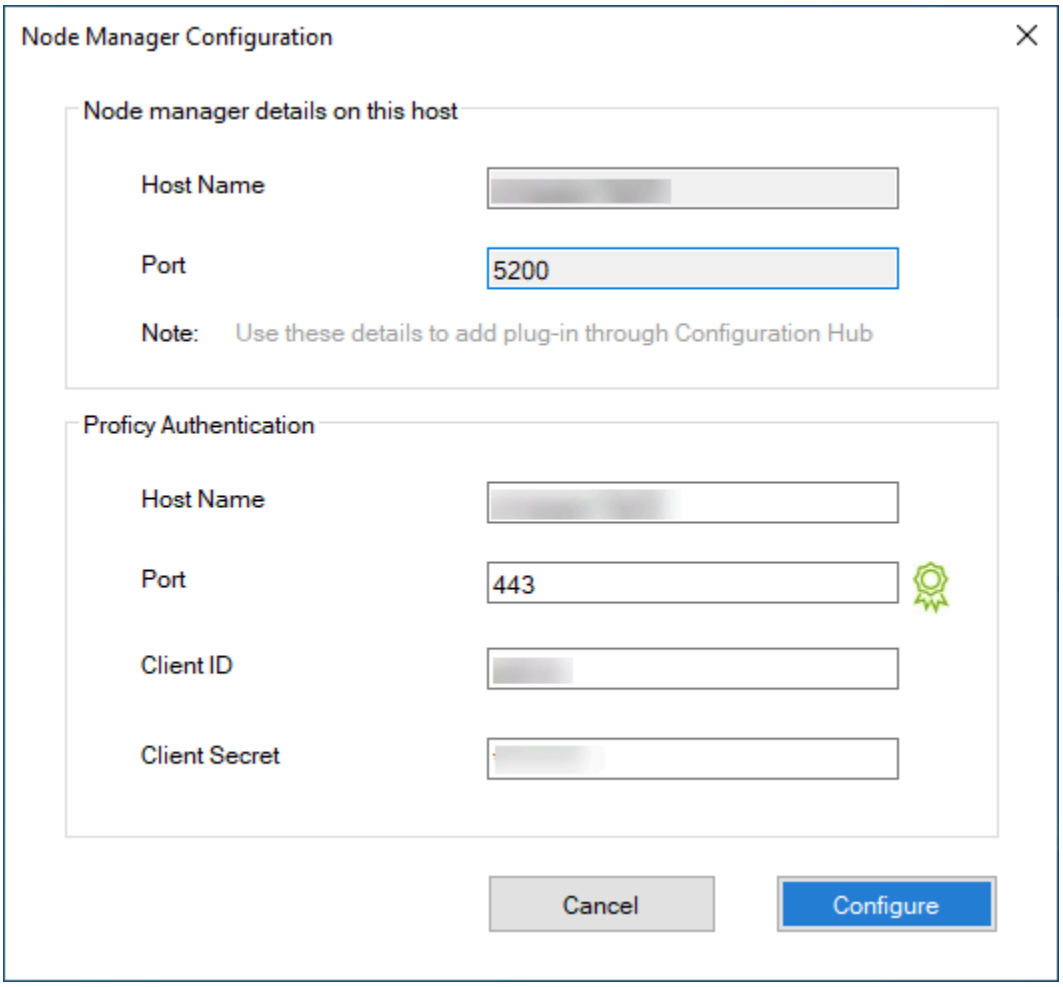
Scenario	Tasks to Perform
If you migrate to a new Proficy Authentication server.	1. Unregister CIMPLICITY plugin *(on page 1014)*. 2. Unregister Configuration Hub with the old Proficy Authentication server and register with the new Proficy Authentication server. 3. Configure the CIMPLICITY node to use the new Proficy Authentication server *(on page 991)*. 4. Register the CIMPLICITY plugin using the Configuration Hub Administration option *(on page 993)*.
If you migrate to a new Configuration Hub server.	1. Unregister CIMPLICITY plugin *(on page 1014)* from the old Configuration Hub server. 2. Register the new Configuration Hub server with the existing Proficy Authentication server. 3. Register the CIMPLICITY plugin using the Configuration Hub Administration option *(on page 993)*.
If you migrate both the new Configuration Hub server and the Proficy Authentication server.	1. Unregister CIMPLICITY plugin *(on page 1014)* from the old Configuration Hub server. 2. Register the new Configuration Hub server with the new Proficy Authentication server. 3. Configure the CIMPLICITY node to use the new Proficy Authentication server *(on page 991)*. 4. Register the CIMPLICITY plugin using the new Configuration Hub Administration option *(on page 993)*.

Register the CIMPLICITY Node with Proficy Authentication

Ensure that you have already installed CIMPLICITY 2024, Configuration Hub 2024, and Proficy Authentication 2024, or upgraded them to 2024.

This topic describes how to configure the CIMPLICITY node with the Proficy Authentication server used by Configuration Hub, with which you need to register the CIMPLICITY node. The following steps must be performed on the machine where the CIMPLICITY node is located.

1. From the desktop, open the **Node Manager Configuration** utility as an administrator. The **Node Manager Configuration** utility appears.



Node manager details on this host- This section displays the CIMPLICITY node's hostname and port number. Make a note of it as you will need these details while you add the node in Configuration Hub.

Proficy Authentication- This is the section where you must enter the details of the Proficy Authentication server that the CIMPLICITY node will use, as well as the one Configuration Hub is using. This will enable Configuration Hub to trust the CIMPLICITY node when you add it.

2. In the **Proficy Authentication** section, enter the following details:

Field	Description
Host Name	The hostname of the Proficy Authentication server to which you want to connect the CIMPLICITY node.
Port	The port number of the Proficy Authentication server. By default, it is 443.
Client ID	The client ID of the Proficy Authentication server, provided during the Proficy Authentication server installation.
Client Secret	The client secret of the Proficy Authentication server, provided during the Proficy Authentication server installation.

If the root certificate of the Proficy Authentication server is not trusted, then click not trusted

, the **Certificate Details** page appears. Select **Trust** to trust the root certificate.

3. After you enter the needed details, select **Configure**.
A success message appears stating that the Proficy Authentication was commissioned with Node Manager.

Add the CIMPLICITY Node and Register the Plug-in with Configuration Hub *(on page 993)*

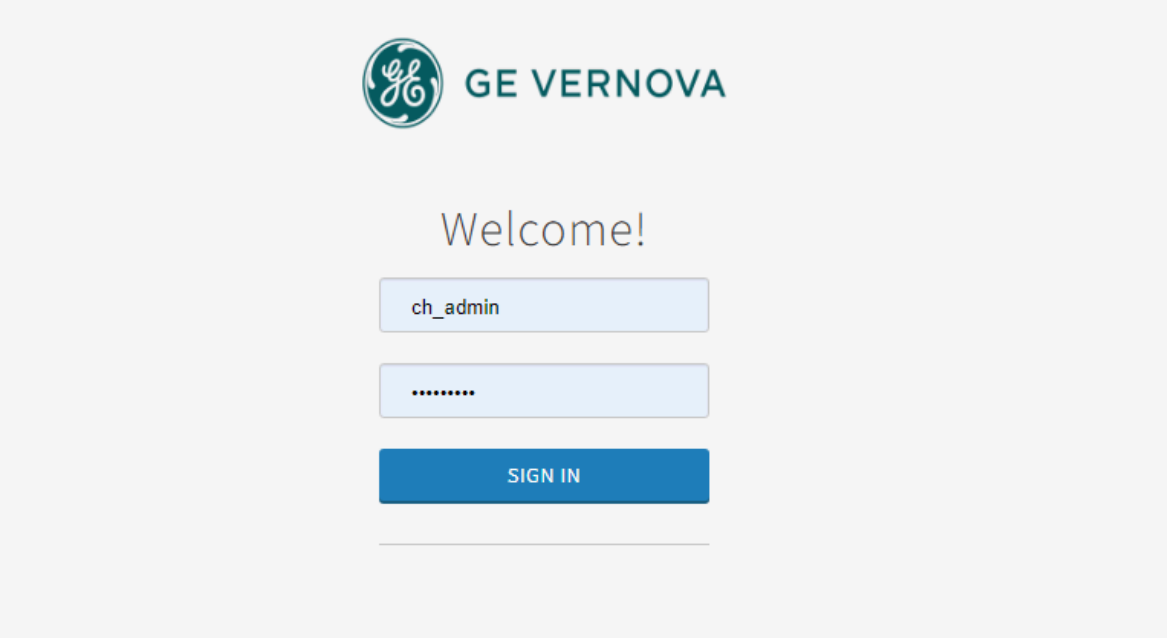
Add the CIMPLICITY Node and Register the Plug-in with Configuration Hub

Ensure that you have already Configured the CIMPLICITY Node to use Proficy Authentication *(on page 991)*.

To use the CIMPLICITY plug-in in Configuration Hub, you must add the CIMPLICITY node in Configuration Hub.

To add the CIMPLICITY node in Configuration Hub, perform the following steps:

1. In the machine that has Configuration Hub installed, in the desktop, double-click .
   The Proficy Authentication login page appears.



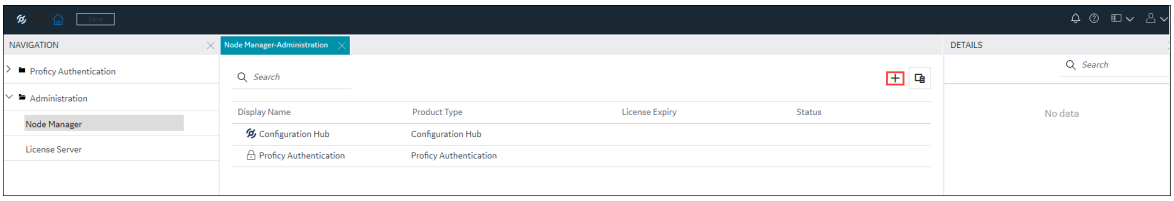
2. Log in using ch_admin as username and your Proficy Authentication secret as password.
   After a successful authentication, the Configuration Hub page appears.

   By default, in the **NAVIGATION** pane, the Proficy Authentication and Administration plug-in appear.

3. In the **NAVIGATION** pane, select **Administration**, and then expand it.
   Node Manager and **License Server** appear.

4. Select **Node Manager**.

   The **Node Manager-Administration** panel appears, displaying the Configuration Hub and Proficy Authentication details.

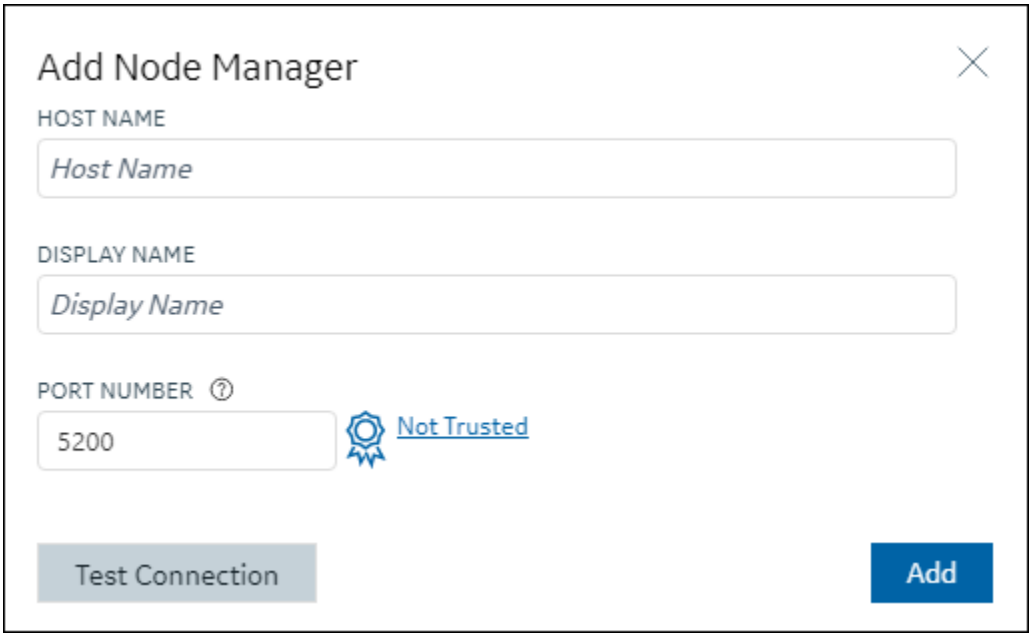


5. Select

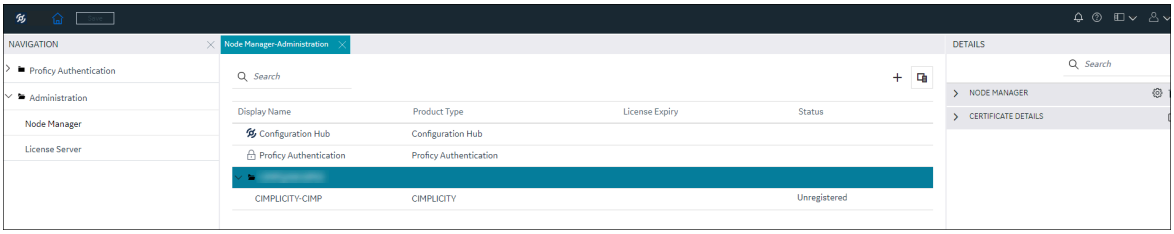
   .

   The **Add Node Manager** window appears.

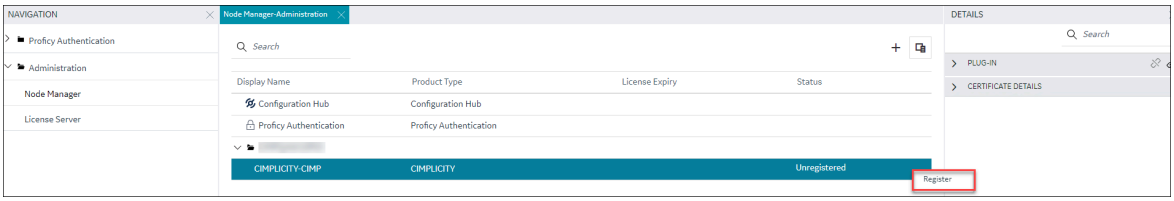


6. Enter the **HOST NAME**. Here, it is the CIMPLICITY node. For example, testmachine123.

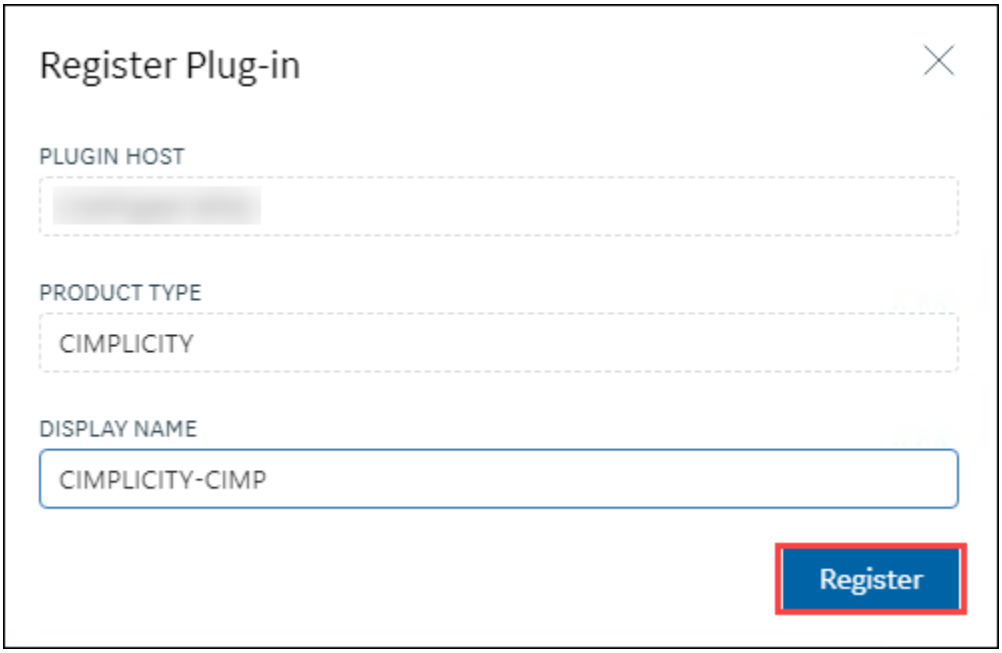
7. Enter the **DISPLAY NAME** for the CIMPLICITY node. By default, the hostname is added as the display name.
8. Enter the **PORT NUMBER** of the host that you entered.
9. You must trust the node manager certificate. To trust the certificate, select **Not Trusted**.
   The **Certificate Details** window appears, listing the certificate information.
10. Read the certificate details and if you trust, select **Trust**.
    In the **Add Node Manager** window, the certificate status changes to trusted.
11. Select **Test Connection**.
    If the connection is successful, a success message appears. If not, check if the host name and the port are correct.
12. Select **Add**.
    The CIMPLICITY node is added, along with the CIMPLICITY plug-in. However, the plug-in will be in an unregistered state because, it was just the CIMPLICITY node added in Configuration Hub, and the plug-in is yet to be registered with Configuration Hub.



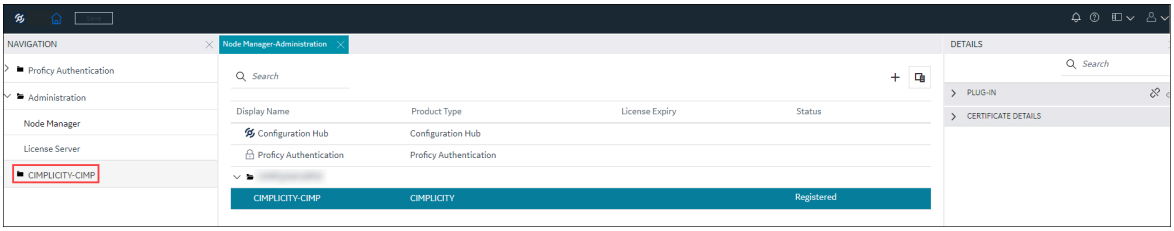
13. Right-click the plug-in row, and then select **Register**.



The **Register Plug-in** window appears, displaying the plug-in's host, product type, and display name.



14. If needed, modify the plug-in name, and then select **Register**.
    The plug-in is registered with Configuration Hub, and displayed in the **NAVIGATION PANE**.



Alternatively, you can register a plug-in from the Plugin **DETAILS** section by selecting  on the top-left corner in the **PLUG-IN** section.

-OR-

You can right-click the node, and then select **Manage Plug-ins**.

The **Manage Plug-ins** window appears, allowing you to select the plug-in in the node and register it.

a. Select the plug-in as needed.
b. Select **Register**.

The plug-in gets registered.

You can start to use the plug-in to browse your CIMPLICITY projects, start or stop the projects, browse devices like OPC UA, and MQTT, and create SCADA points. For more information, refer to Overview of CIMPLICITY Plug-in within Configuration Hub *(on page 984)*.

Managing CIMPLICITY Plug-in in Configuration Hub

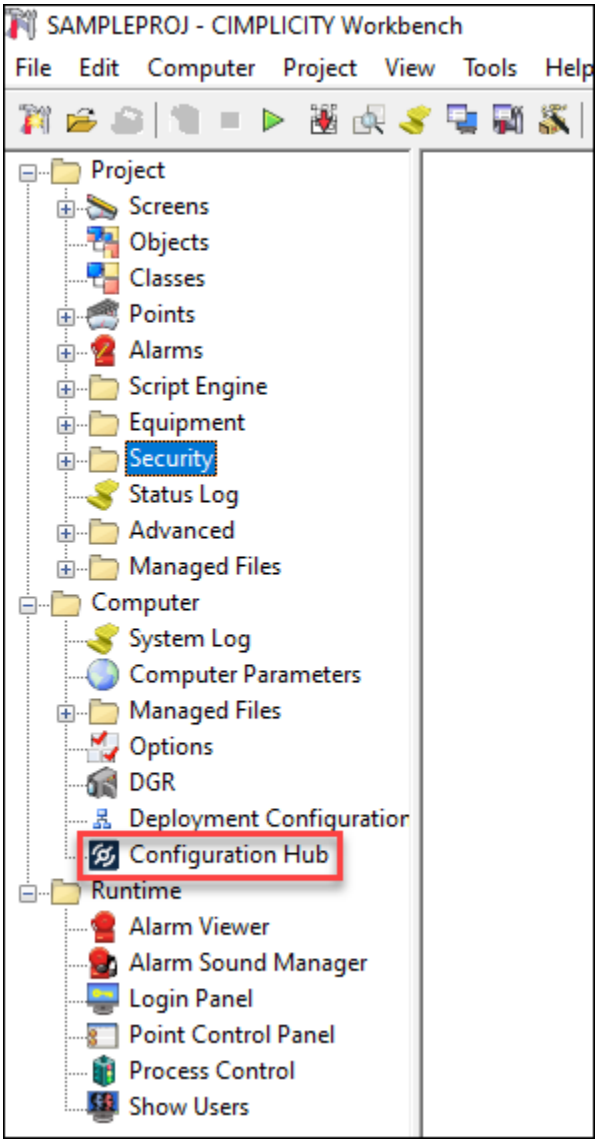
Start and Stop a CIMPLICITY Project

You can start a project and stop a running project from Configuration Hub. In case of a Redundant server configured project, you will have additional options to start or stop projects at the primary or secondary level.

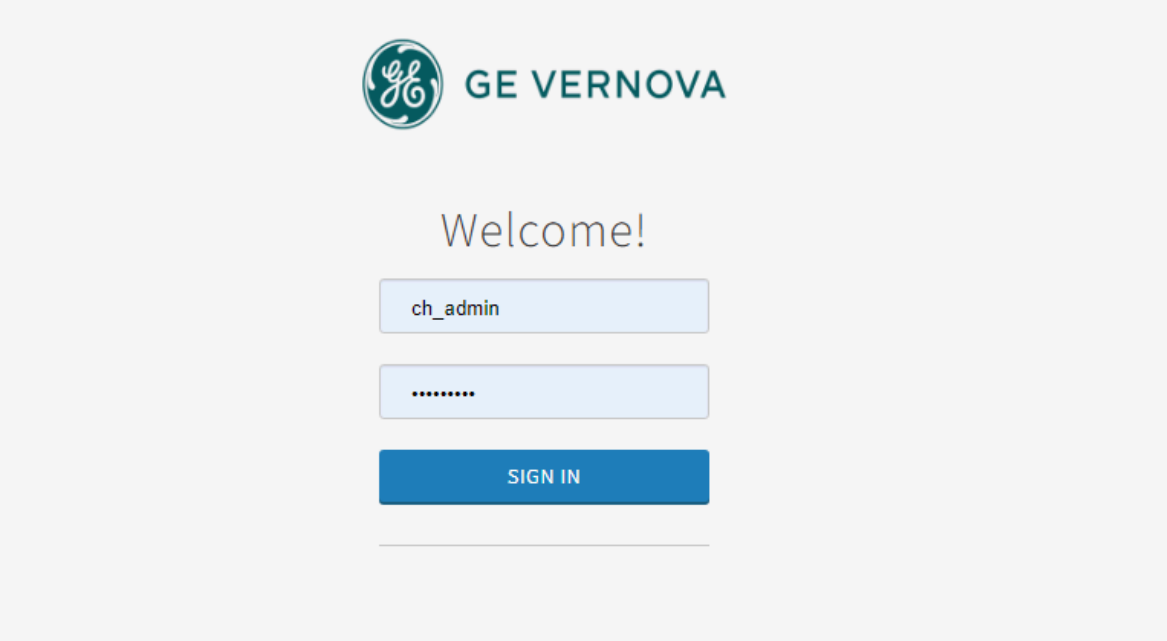
Note:
If you have set the CIM_SSL_STRICTPOLICY parameter to **Y** (recommended), it is important that the primary server trusts the secondary server's SSL certificate, and vice versa.

To start a project, perform the following:

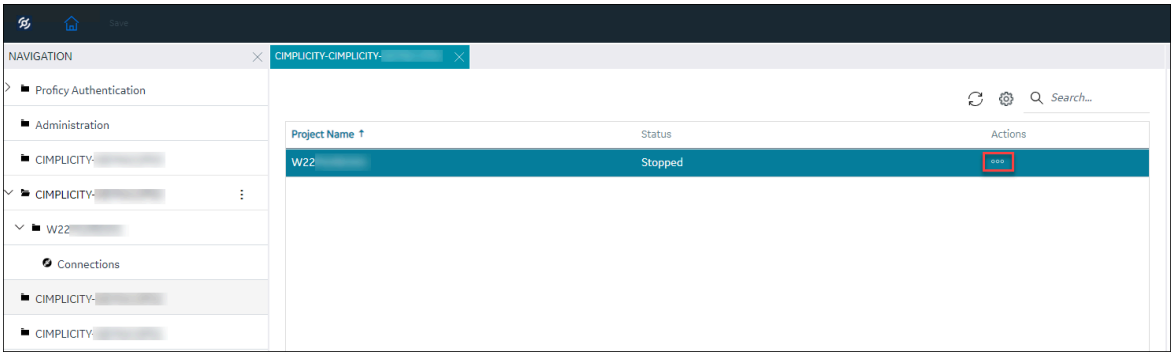
1. In the machine that has Configuration Hub installed, in the desktop, double-click .
   Alternatively, in the CIMPLICITY node machine, you can open Configuration Hub from the Workbench.



The Proficy Authentication login page appears.



2. In the **NAVIGATION** pane, select and expand the required node.
   All the associate plug-in and its projects are listed.



3. Select a project, and then select the ellipsis (...) to the right of your entry in the **Actions** column.
   Alternatively, you can right-click on the required project and select the actions as needed.
   A popup menu appears.
4. Select an action as needed.
   The below table explains the available options:

Option	Description
Start	Select this to start a stopped project.
Stop	Select this to stop a running project.

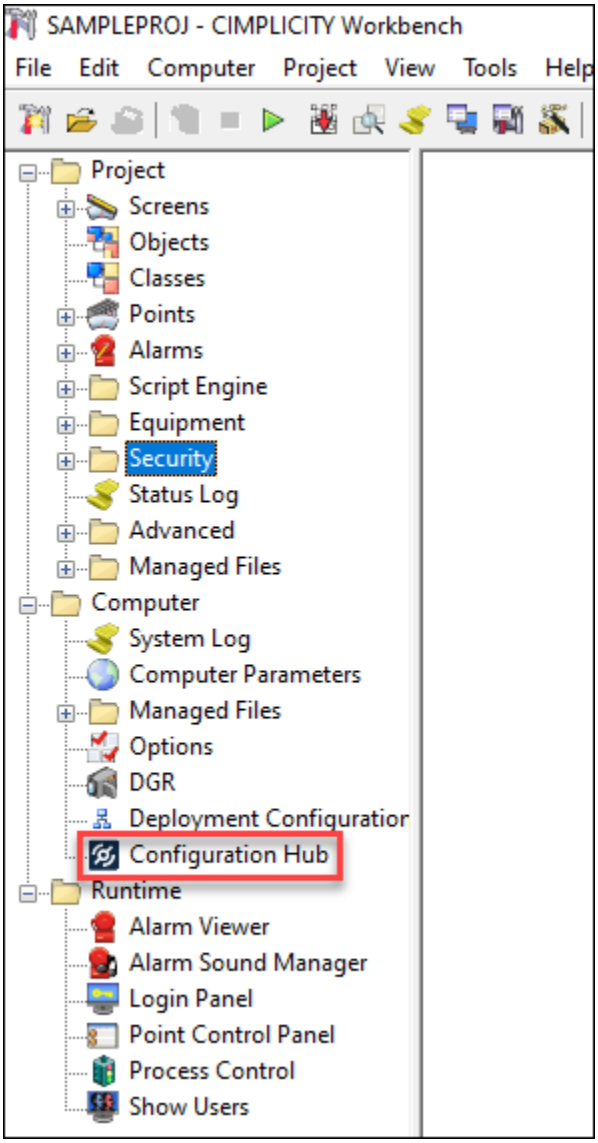
Option	Description
Start Primary and Secondary	Select this to start a stopped project in both primary and secondary servers.
Start Primary	Select this to start a stopped project in primary server only.
Start Secondary	Select this to start a stopped project in secondary server only.
Stop Primary and Secondary	Select this to stop a running project in both primary and secondary servers.
Stop Primary	Select this to stop a running project in primary server only.
Stop Secondary	Select this to stop a running project in secondary server only.

If you select **Stop**, a confirmation popup appears. Select **Yes** to stop the project.

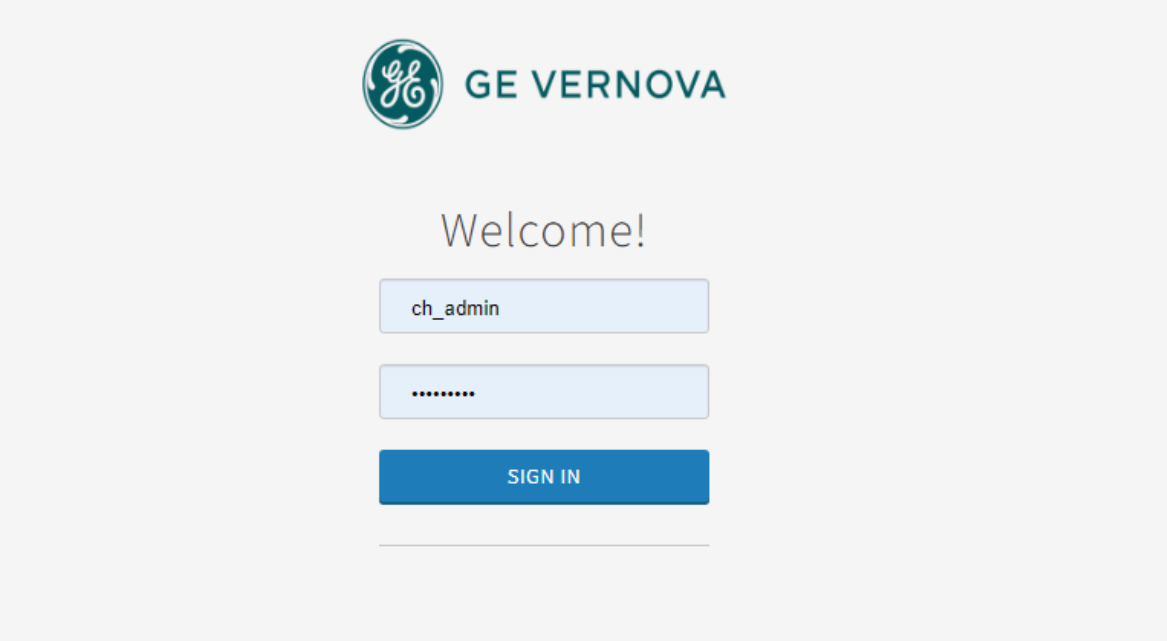
Select and Browse Devices

You can log in to Configuration Hub and browse through all the OPC UA devices that are associated to a project.

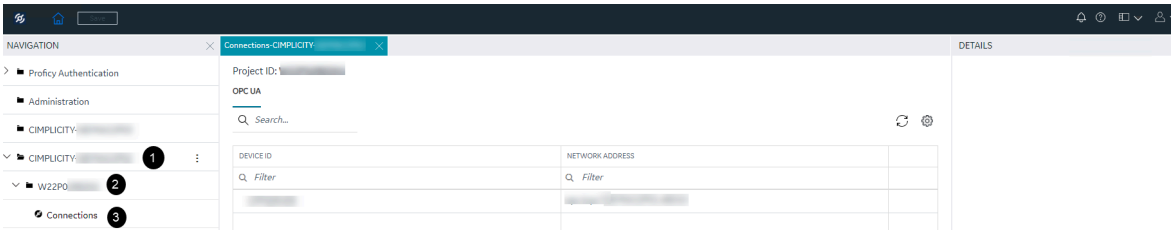
1. In the machine that has Configuration Hub installed, in the desktop, double-click  . Alternatively, in the CIMPLICITY node machine, you can open Configuration Hub from the Workbench.



The Proficy Authentication login page appears.

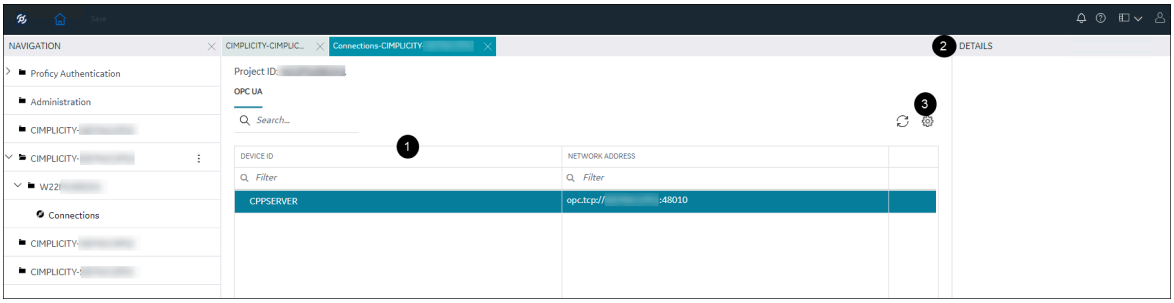


The Configuration Hub page appears, listing all the CIMPLICITY nodes and their associated plug-ins in the **NAVIGATION** pane.



Marker	Description
1	CIMPLICITY Node/ computer registered with Configuration Hub and Proficy Authentication.
2	Project associated to the CIMPLICITY node.
3	**Connections** is displayed only if a Project is configured with devices. You can click **Connections** to browse all the available devices and create points.

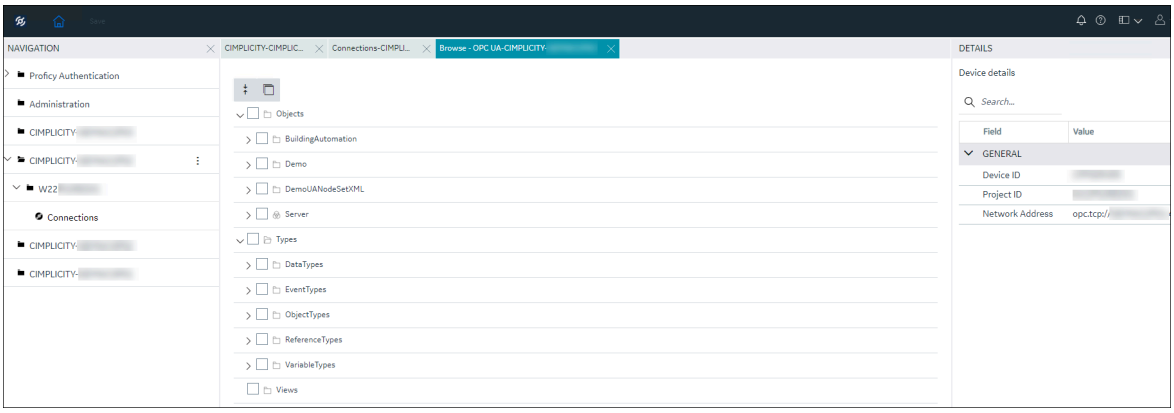
2. From the left pane, expand the required project and select **Connections**.
   The devices tab appears, listing all the associated devices.



Marker	Description
1	List of all the OPC UA devices associated to the project.
2	Details of the selected device. **Note:** This is read-only. In case of a redundancy project, you can see the details like node name, status, and path of the configured primary and secondary servers.
3	Column chooser. You can select what all information of a device you want to view in the grid. **Available options**: ◦ Device ID ◦ Network Address ◦ Description ◦ Port Type ID

3. Select a device, and then select the ellipsis (...) to the right of your entry.
   A popup menu appears.
4. From the popup menu, select **Browse**.
   A new tab appears, listing the device and all its associated objects.

Note:
If you are already browsing a device, you will be prompted with a popup stating that you are already browsing a device and whether you want to replace it. If you select **Yes**, the existing device tab is replaced with the selected device.



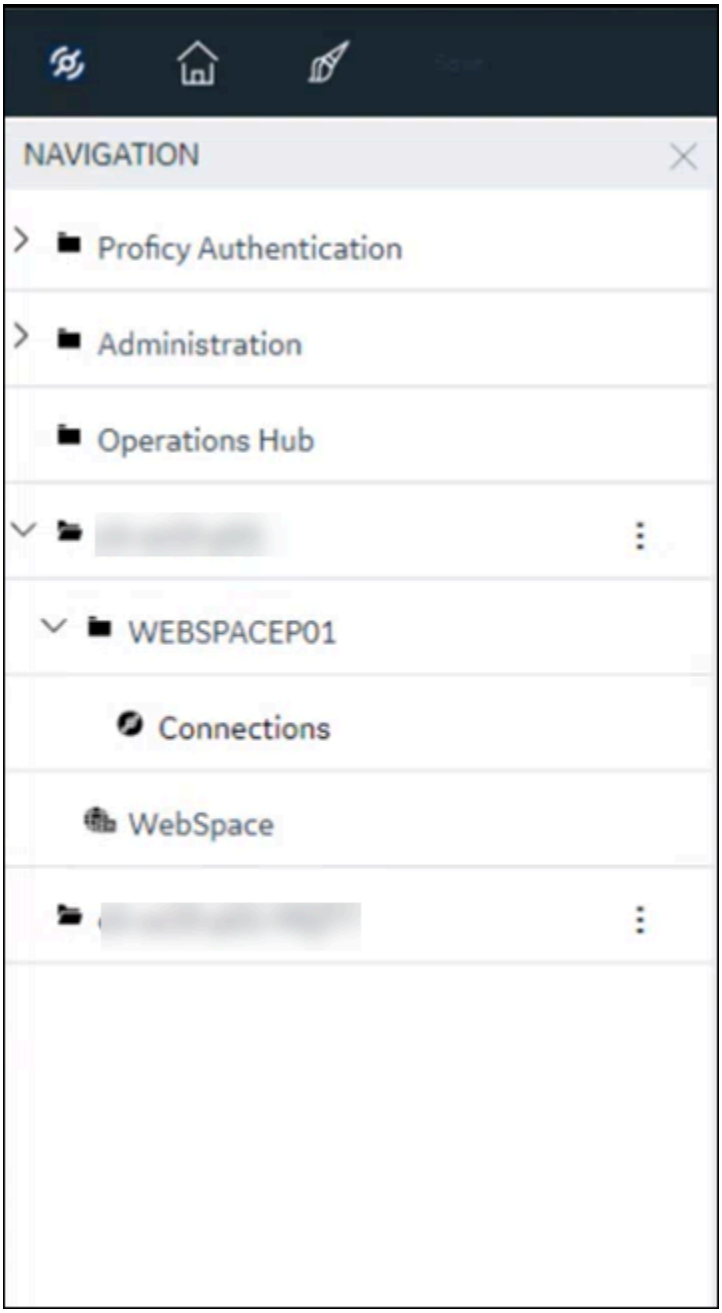
You can now create SCADA points from the objects displayed for the selected device.

Select and Browse Tags from an MQTT Device

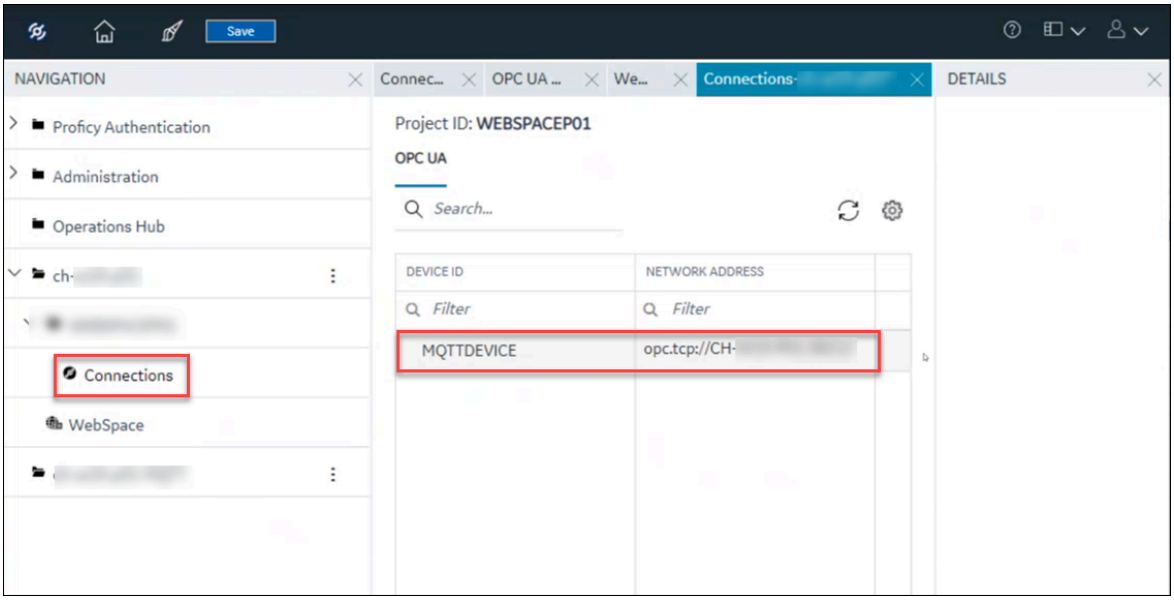
You can log in to Configuration Hub and browse through all the configured MQTT Devices and read the values. To browse an MQTT device using the CIMPLICITY plug-in, you must do the following configurations:

- Configure MQTT Client on Configuration Hub where your CIMPLICITY plug-in is registered. For more information, see the MQTT Client documentation in the *Getting Started* section.
- After you configure the MQTT Client, you must create an MQTT Device in the CIMPLICITY Workbench. And add the MQTT Client's endpoint URL. For example, opc.tcp://<Host-name>:3812 in the OPC UA DA Configuration tab. Creating an MQTT device is similar to creating an OPC UA device as described in the OPC UA DA Configuration section.

1. Log in to Configuration Hub. For more information, see Access Configuration Hub *(on page 985)*. The Configuration Hub page appears, listing all the CIMPLICITY nodes and their associated plug-ins in the **NAVIGATION** pane.

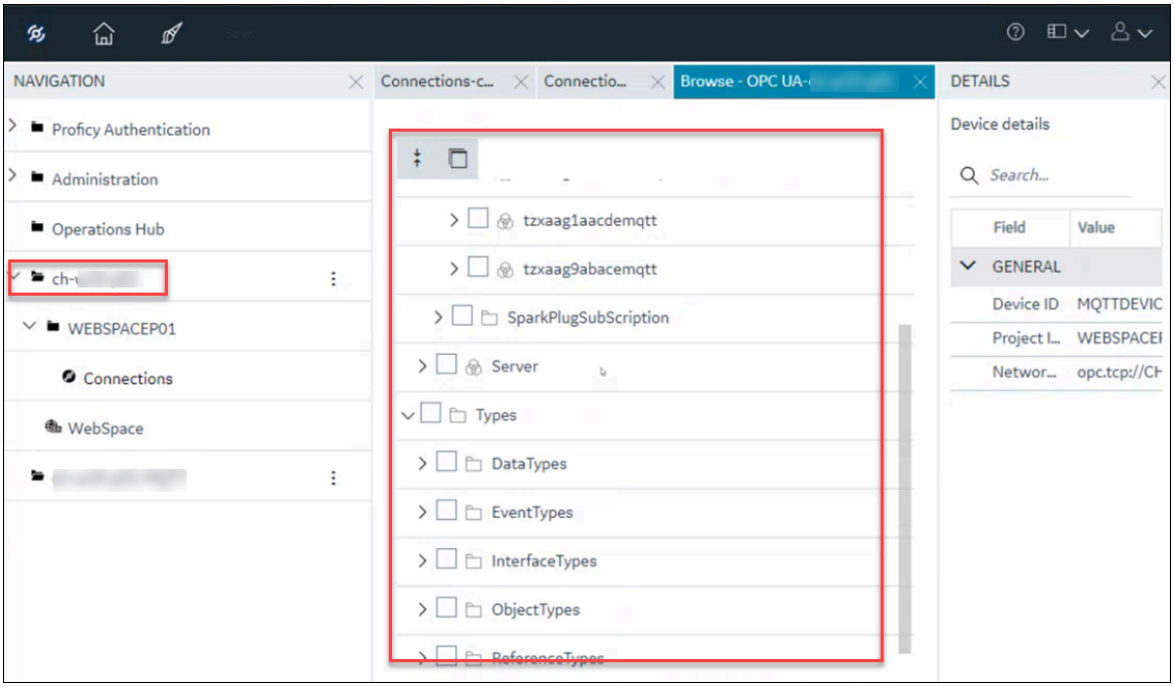


2. From the left pane, expand the required project and select **Connections**.
   The devices tab appears, listing all the associated devices.



3. Select a device, and then select the ellipsis (...) to the right of your entry.
   A popup menu appears.
4. From the popup menu, select **Browse**.
   A new tab appears, listing the device and all its associated objects.

> **Note:**
> If you are already browsing a device, you will be prompted with a popup stating that you are already browsing a device and whether you want to replace it. If you select **Yes**, the existing device tab is replaced with the selected device.



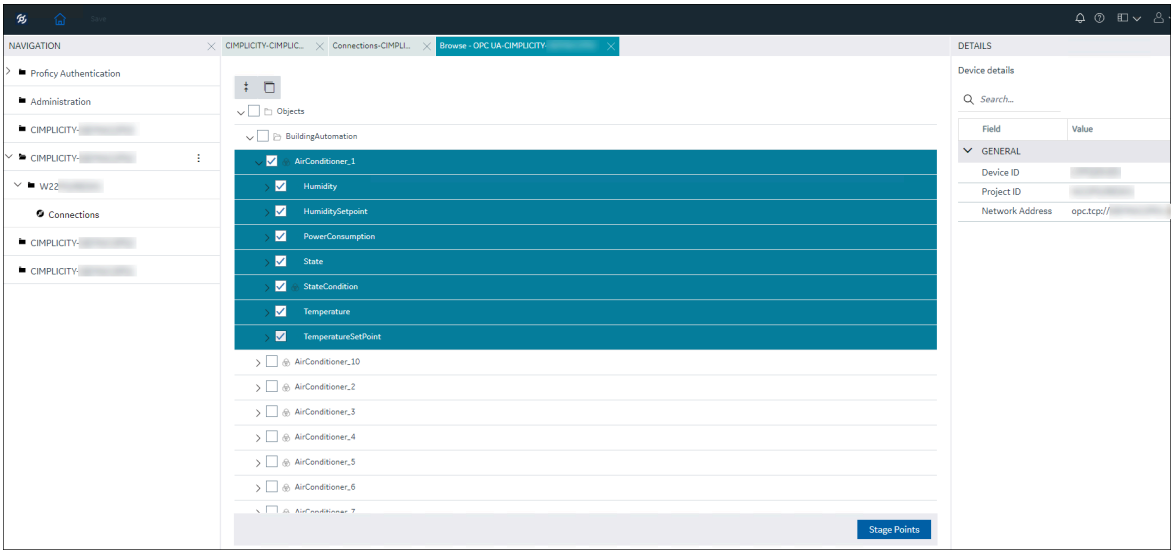
You can view the tags and their details from the MQTT device.

Create SCADA Points

Create SCADA points from the objects. Ensure that you browsed a device to proceed with point creation.

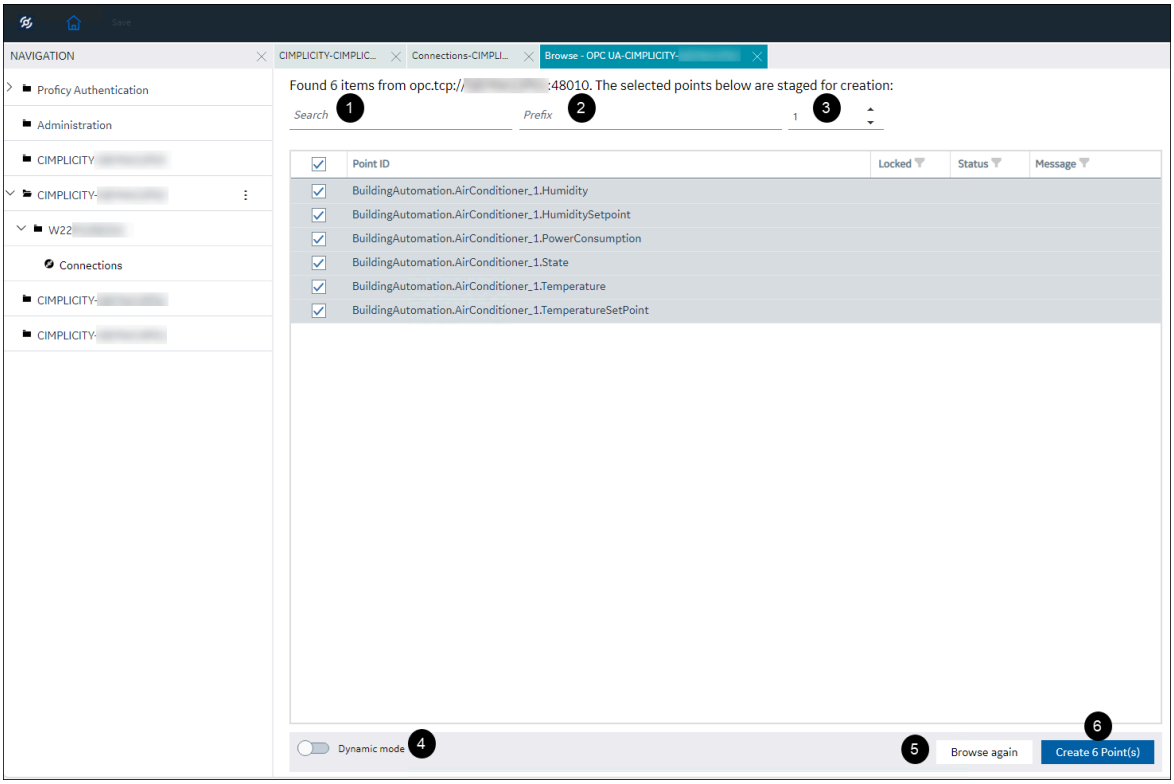
To create points, perform the following:

1. Select the objects.
   You can either right-click the node, and then select **Select all children**, or to select the children of a node, you can double-click the node.
   Once you select objects, the **Stage Points** button is enabled.



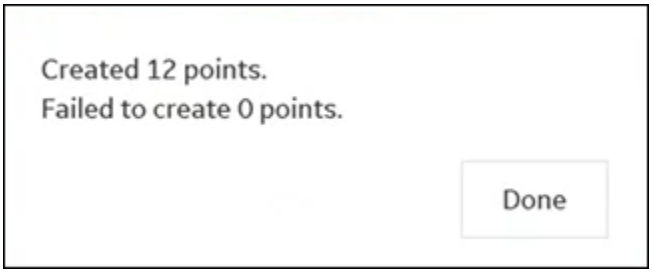
2. Select **Stage Points**.

   All the selected points are staged and listed.

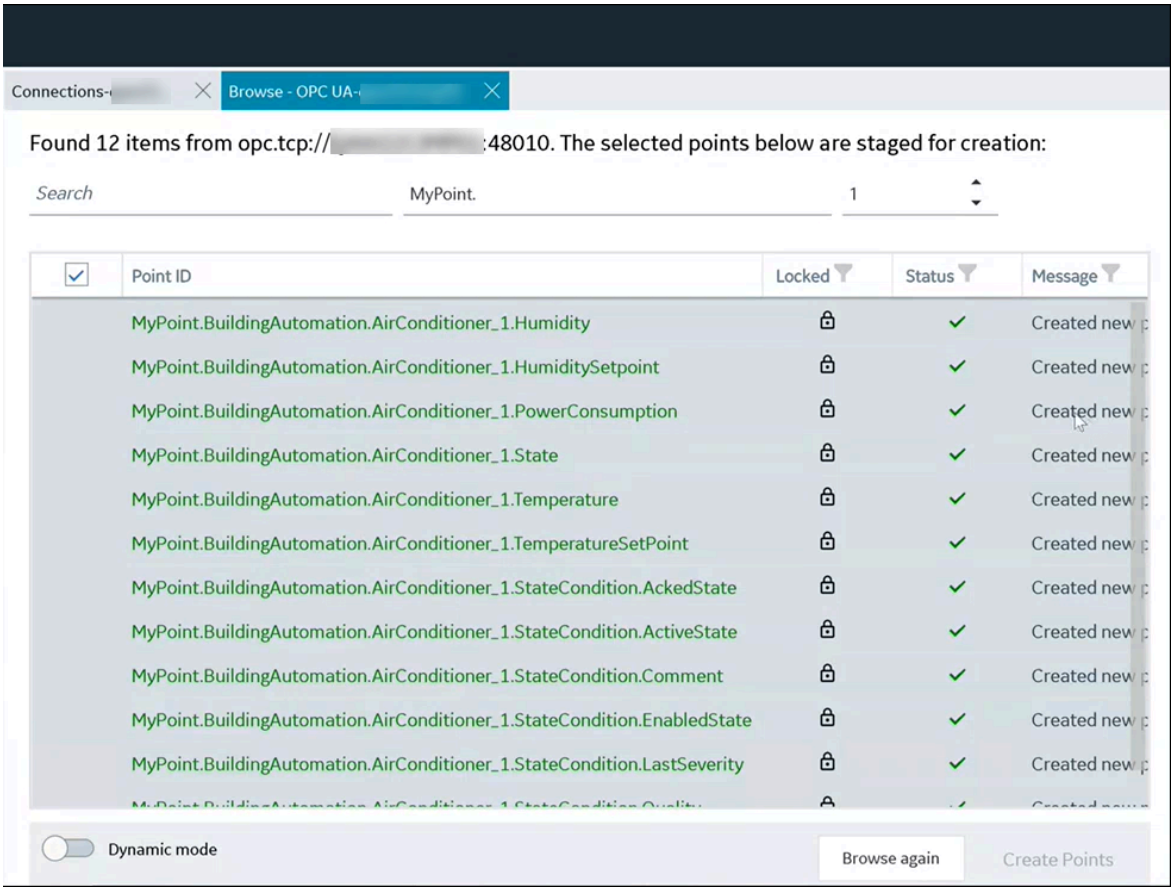


Marker	Description
1	Enter text to display point IDs that contain the entered text.
2	Enter a prefix to the name of the points that will be created.
3	Enter the number of levels in the namespace to be removed from the beginning of the point IDs. For example, if you do not want AirConditioner_1 in the namespace, you must select 2.
4	When the project is running, if you toggle on **Dynamic mode**, the points that are created will be available immediately. If you toggle off **Dynamic mode**, the points that are created will become available only after you restart the project **Note:** In a redundant system, for dynamic configuration to work, the CIMPLICITY Configuration Microservice should run as the same user with the same password configured in the redundant pair of systems.
5	Select this to browse the devices and objects again. **Note:** This will be enabled only after you create points for the selected objects.
6	Select this to create points.

3. Select **Create** (number of points selected) **Points**.
   The points are created, and the results are displayed.



4. Select **Done**.
   All the created points and their status are listed.

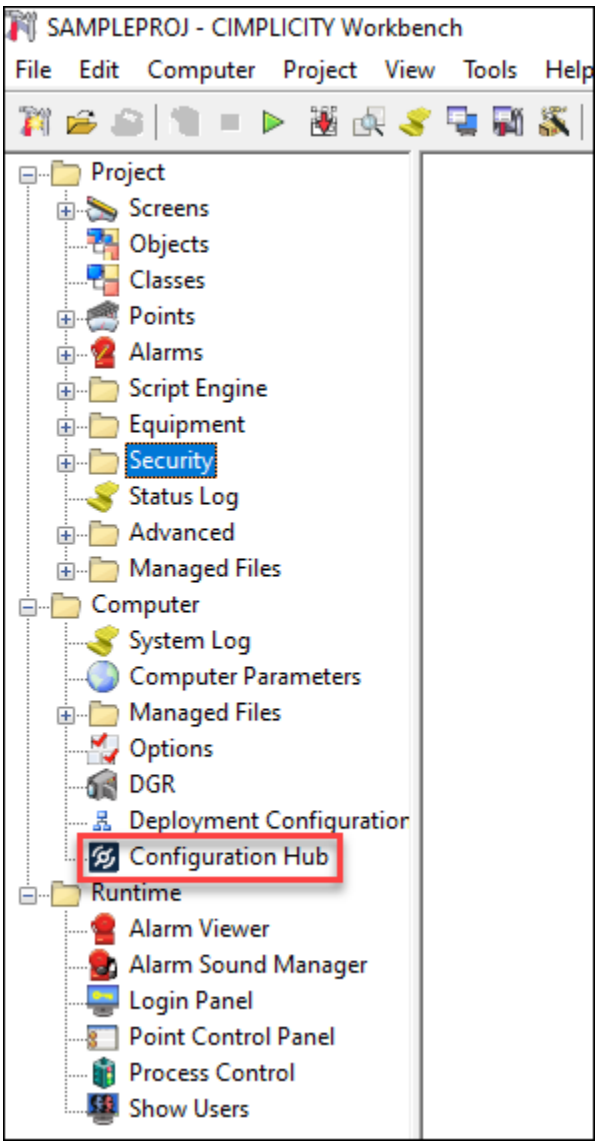


Update or Modify CIMPLICITY Node or Plug-in

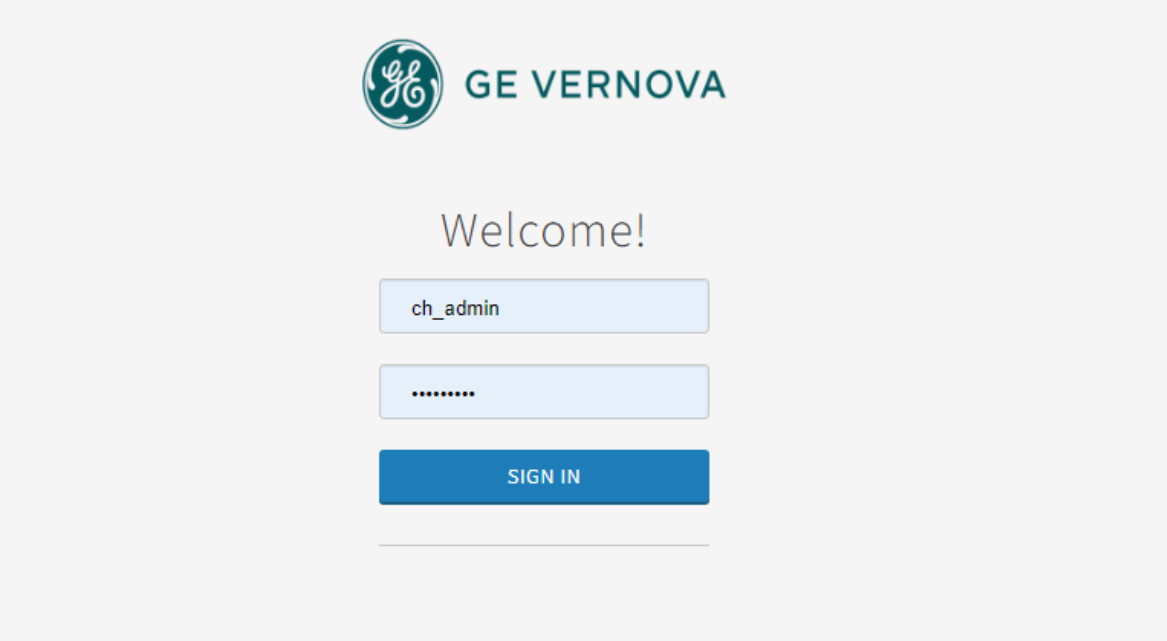
If you want to modify the alias name for the CIMPLICITY plug-in or the node that is registered with Configuration Hub, you can do that using the node manager in Configuration Hub.

To update or modify the plug-in, do the following:

1. In the machine that has Configuration Hub installed, in the desktop, double-click . Alternatively, in the CIMPLICITY node machine, you can open Configuration Hub from the Workbench.



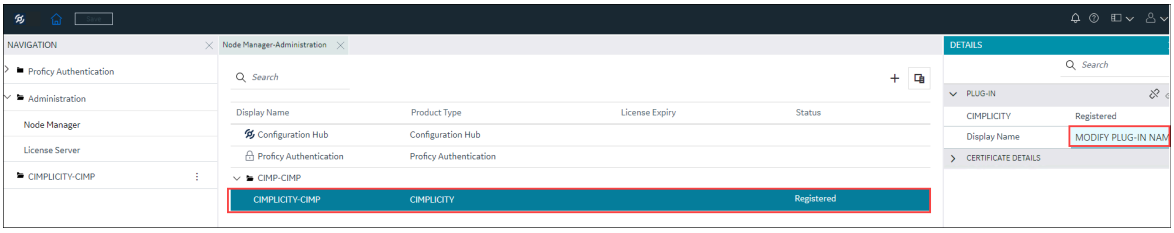
The Proficy Authentication login page appears.



2. Log in using ch_admin as username and your Proficy Authentication secret as password.
   After a successful authentication, the Configuration Hub page appears.

   By default, in the **NAVIGATION** pane, the Proficy Authentication and Administration plug-in appear.
3. In the **NAVIGATION** pane, select **Administration**, and then expand it.
   Node Manager and **License Server** appear.

4. Select **Node Manager**.
   The **Node Manager-Administration** panel appears.
5. To modify a plug-in display name, expand the node, and then select the plug-in.



6. In the right-side pane, in the **PLUG-IN** details, you can enter a new display name for the plug-in.
   The display name of the plug-in gets updated.

   Alternatively, you can right-click the node, and then select **Manage Plug-ins**.

   The **Manage Plug-ins** window appears, allowing you to select the plug-in in the node and modify the plug-in's display name.

a. Select the plug-in as needed.
b. In the **Plugin Display Name** column, modify the name of the plug-in.
c. Select **Update**.

The plug-in name gets modified.

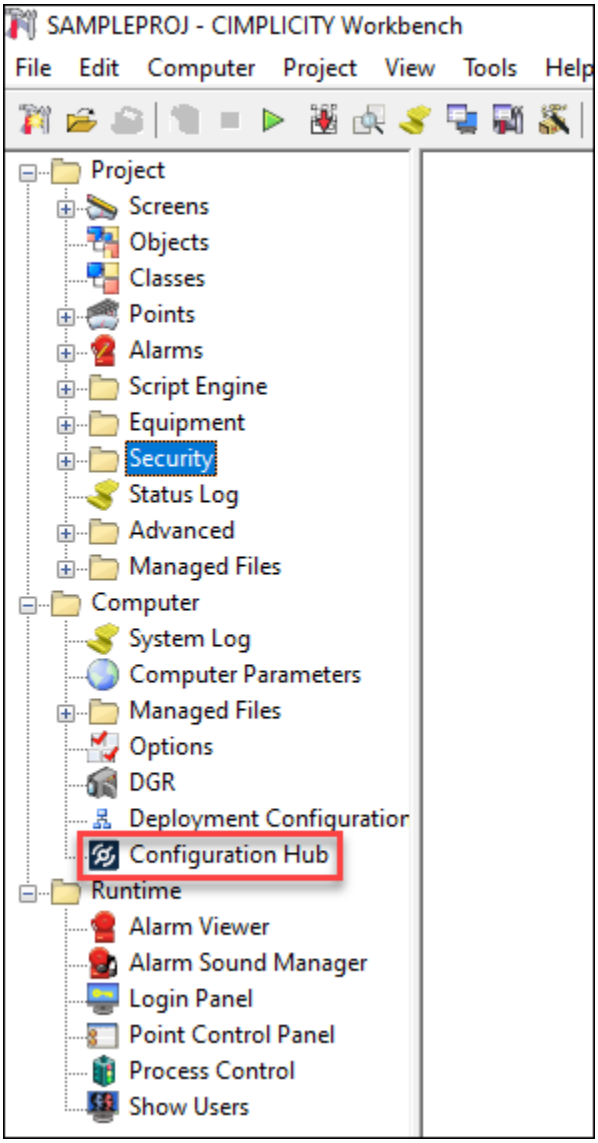
7. To modify a node's display name, select the node.
8. In the right-side pane, in the **NODE MANAGER** details, you can enter a new display name for the node.
   The display name of the node gets updated.

Unregister CIMPLICITY Plug-in

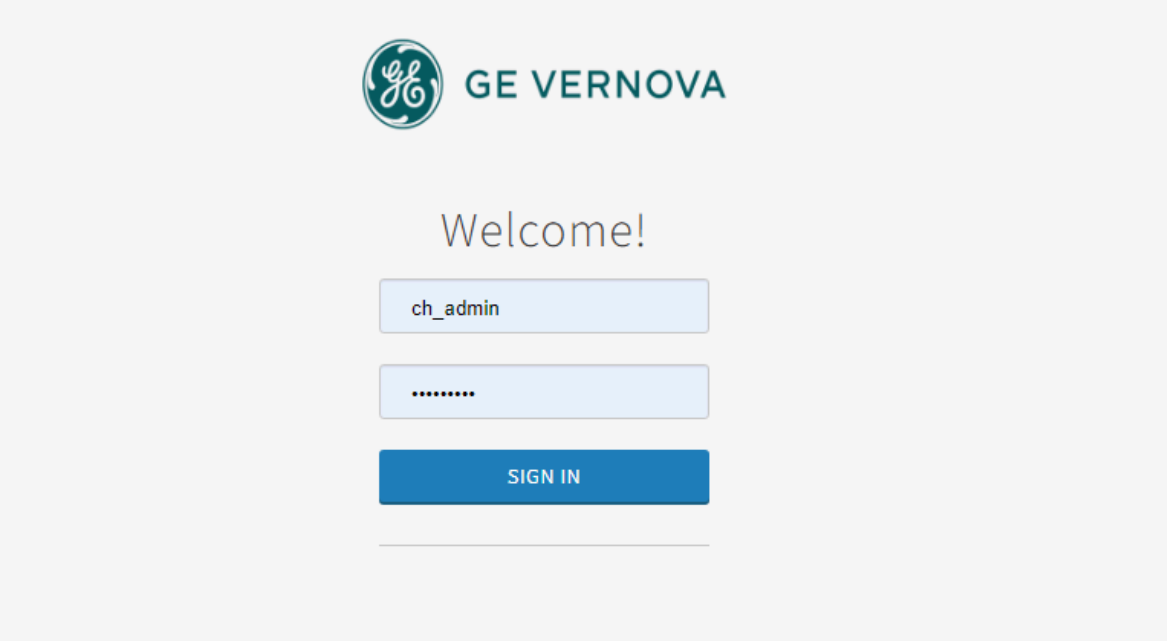
If you do not need a CIMPLICITY plug-in in Configuration Hub, you can unregister the plug-in completely from Configuration Hub. Once you unregister the plug-in, that plug-in's node is completely removed along with all the associated projects.

To unregister a CIMPLICITY plug-in, do the following:

1. In the machine that has Configuration Hub installed, in the desktop, double-click  .
   Alternatively, in the CIMPLICITY node machine, you can open Configuration Hub from the Workbench.



The Proficy Authentication login page appears.

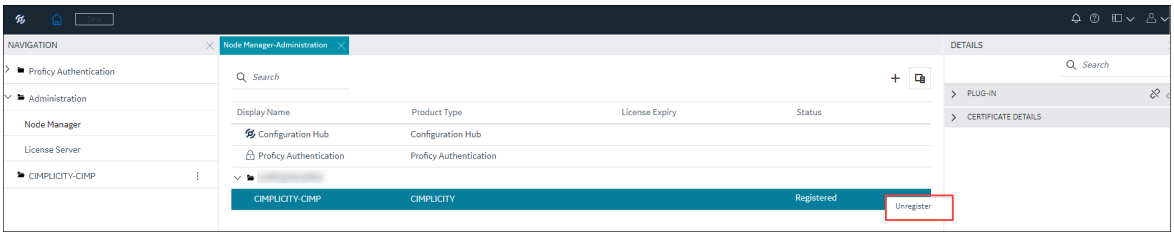


2. Log in using ch_admin as username and your Proficy Authentication secret as password.
   After a successful authentication, the Configuration Hub page appears.

   By default, in the **NAVIGATION** pane, the Proficy Authentication and Administration plug-in appear.

3. In the **NAVIGATION** pane, select **Administration**, and then expand it.
   Node Manager and **License Server** appear.

4. Select **Node Manager**.
   The **Node Manager-Administration** panel appears.



5. Expand the CIMPLICITY node, and right-click the plug-in, and then select **Unregister**.
   The **Unregister Plug-in** confirmation window appears, prompting you to confirm whether to continue with the unregistration.

> **Note:**
> If you unregister the plug-in, it will be removed from the **NAVIGATION** pane, and any open or unsaved changes that belong to this plug-in will be discarded. However, the plug-in will remain intact but, in an unregistered state.

6. Select **Continue**.
   The Plug-in is unregistered, and removed from the **NAVIGATION** pane.

   If you need to register the same plug-in again, you can right-click the plug-in and select **Register**, and then provide the needed details.

   Alternatively, you can unregister a plug-in from the Plugin **DETAILS** section by selecting  on the top-right corner in the **PLUG-IN** section.

   -OR-

   You can right-click the node, and then select **Manage Plug-ins**.

   The **Manage Plug-ins** window appears, allowing you to select the plug-in in the node and unregister it.
   a. Select the plug-in(s) as needed.
   b. Select **Unregister**.

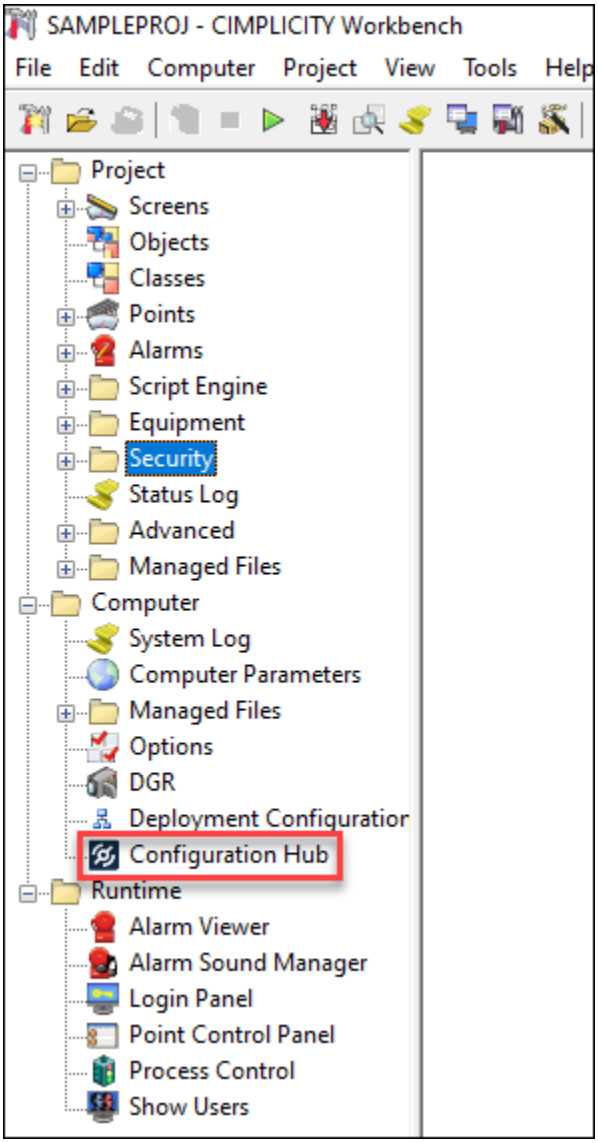
      The plug-in(s) get unregistered.

Delete CIMPLICITY Node

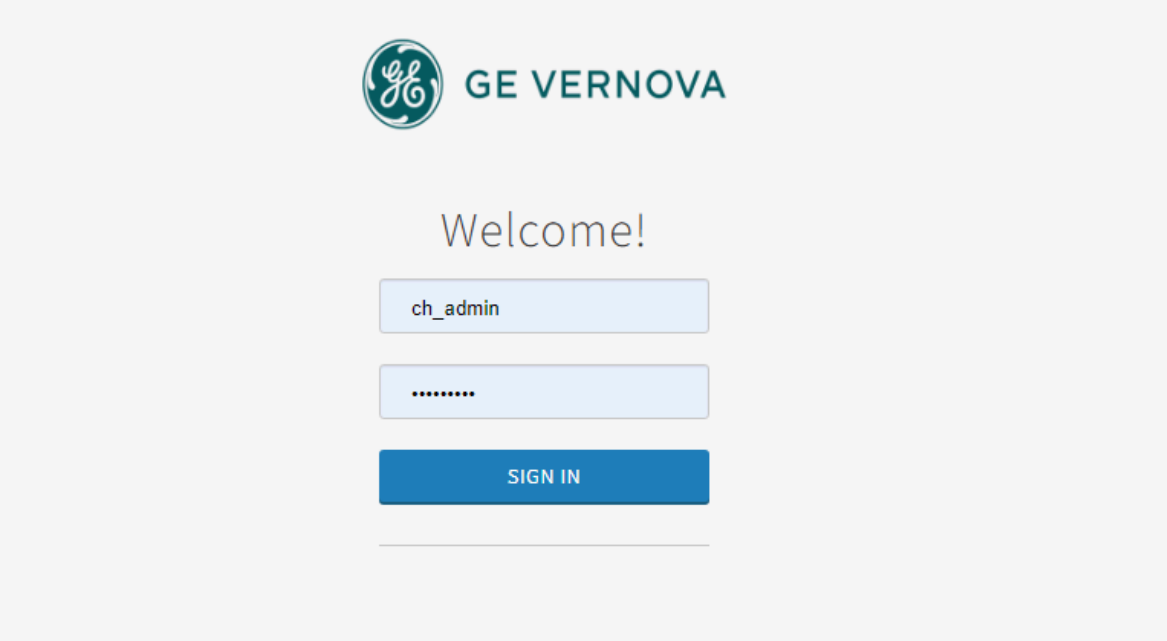
If you want to delete a CIMPLICITY node from Configuration Hub, you can delete it using **Node Manager-Administration**.

> **CAUTION:**
> Be mindful before you delete a node, as it will completely remove the node, any plug-in in that node, and any open or unsaved changes that belong to that plug-in.

1. In the machine that has Configuration Hub installed, in the desktop, double-click  .
   Alternatively, in the CIMPLICITY node machine, you can open Configuration Hub from the Workbench.

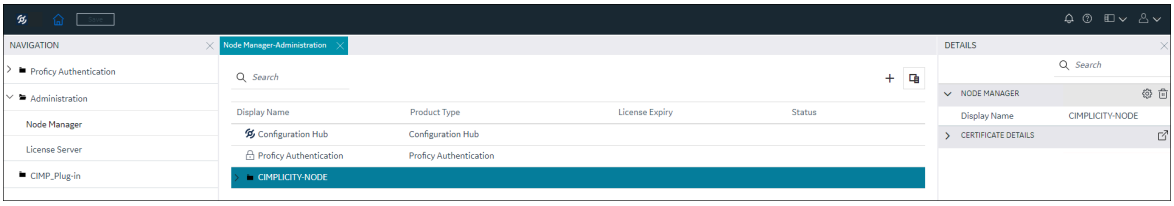


The Proficy Authentication login page appears.



2. Log in using ch_admin as username and your Proficy Authentication secret as password.
   After a successful authentication, the Configuration Hub page appears.

   By default, in the **NAVIGATION** pane, the Proficy Authentication and Administration plug-in appear.
3. In the **NAVIGATION** pane, select **Administration**, and then expand it.
   Node Manager and **License Server** appear.
4. Select **Node Manager**.
   The **Node Manager-Administration** panel appears.



5. Right-click the CIMPLICITY node you want to delete, and then select **Delete**.
   Alternatively, in **NODE MANAGER** details section, select .
   The **Delete Node Manager** confirmation window appears, prompting you to confirm whether to continue with the delete.**Continue**.

   Additionally, if you need to retain the CIMPLICITY plug-in as registered, you can leave the **Un-register all plug-ins on the selected node from Configuration Hub** check box cleared. So, when you add the node again in Configuration Hub, the plug-in also gets added, but it will remain registered, and you do not have to register it again with Configuration Hub.

6. Select **Continue**.
   The Node Manager removes the CIMPLICITY node from the **NAVIGATION** panel. You will need to add the Node Manager again to use the CIMPLICITY node and the plugin.

Chapter 6. Historian

Overview

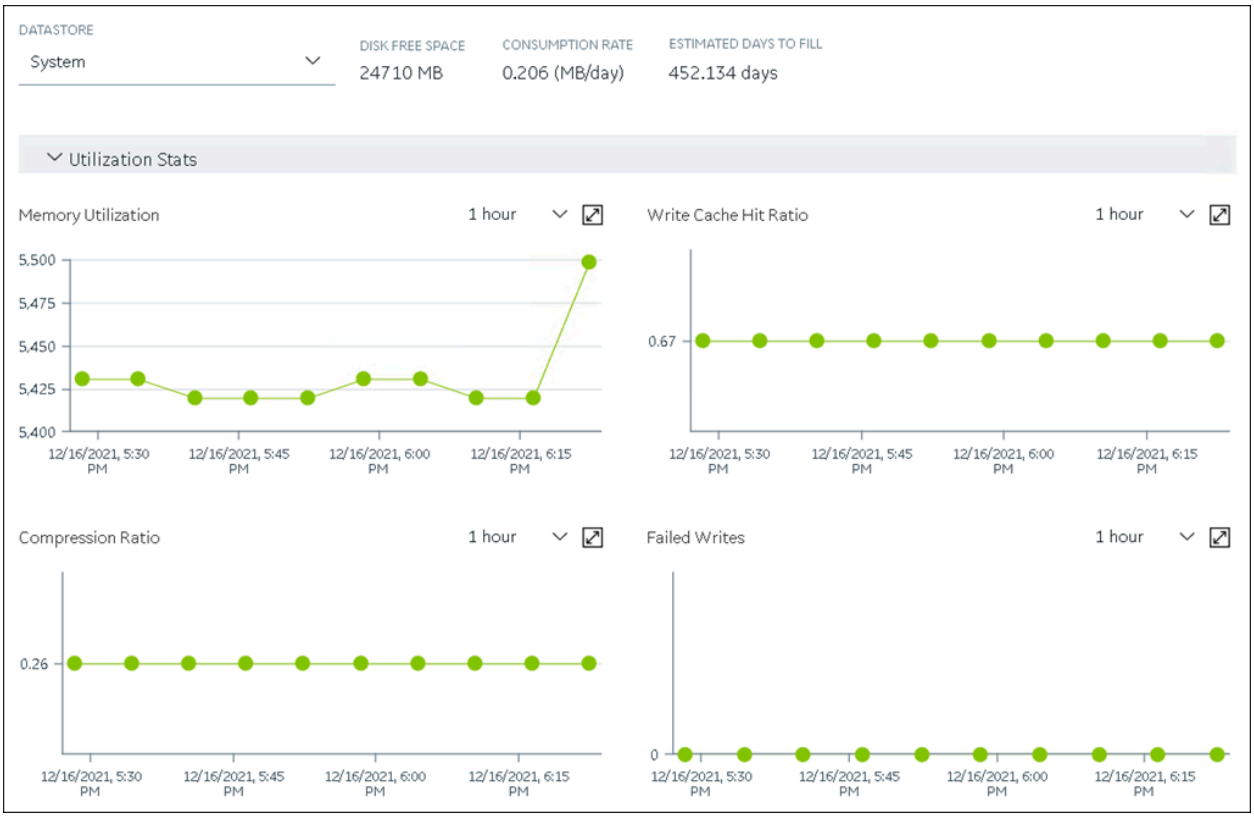
Historian Overview

Proficy Historian is a high-performance data archiving system that collects, stores, and retrieves industrial time-series and Alarms and Events (A&E) information at an extremely high speed.

- Data can be collected from multiple SCADA systems and various applications, and stored in a central Proficy Historian server.
- Using APIs, various clients can retrieve data from the Historian server for asset and process performance analysis.

Overview of Historian in Configuration Hub

The Configuration Hub application allows you to manage the Historian models, Historian systems, and their components.



Advantages of Using Configuration Hub:

- **Creating a Historian model:** You can create and manage object models, which is a hierarchical classification of objects. A model contains object types, variables, and instances.
- **A single application that enables you to manage multiple Historian systems:** A Historian system is a network of Historian servers that collect, store, and retrieve data related to tags, alarms, and events.You can create and manage Historian systems using Configuration Hub. In addition, you can manage collectors, data stores, and tags.
- **Horizontal scalability:** You can increase the storage capacity of a Historian system by connecting multiple software entities so that they work as a single logical unit. This will improve the performance of the Historian system. The storage capacity depends on the number of Historian licenses that you have purchased.
- **High availability:** You can create mirror locations in a Historian system to achieve high availability of the server. If one of the servers is not available, you can retrieve data from the remaining servers in the mirror location.
- **Ease of setting up:** You can install all the collectors used in a Historian system easily by providing the required details with the help of the user-friendly interface.

Types of Historian Systems

- **Stand-Alone:** In a stand-alone Historian system, there is only one Historian server. This type of system is suitable for a small-scale Historian setup. For information on setting up a stand-alone Historian system, refer to About Setting up a Stand-Alone Historian System *(on page 1075)*.
- **Horizontally scalable:** In a horizontally scalable Historian system, there are multiple Historian servers, all of which are connected to one another. This type of system is used to scale out the system horizontally. For example, if you have 5,00,000 tags in your Historian system, you can distribute them among the various servers to improve performance. For information on setting up a horizontally scalable system, refer to About Setting up a Horizontally Scalable System *(on page 1079)*.

Limitations

- If only one machine remains in a mirror location, you cannot remove it.
- If you install Configuration Hub and the Web Admin console on the same machine, and use self-signed certificates for both of them, the login page for Configuration Hub does not appear. To prevent this issue, disable the domain security policies:

1. Access the following URL: chrome://net-internals/#hsts
2. In the **Domain Security Policy** section, in the **Delete domain security policies** field, enter the domain name for Configuration Hub, and then select **Delete**.

- If the primary server is down, you cannot add tags using a distributed node because the Configuration Manager service is down.

Configuration Hub Workflow

This topic provides the high-level steps in using Configuration Hub.

1. Set up Configuration Hub. This involves installing the Historian server, the collectors, and Web-based Clients.
2. Apply the license *(on page)*.
3. Depending on your requirements, set up a stand-alone system *(on page 1075)* or a horizontally scalable system *(on page 1079)*. This involves adding the required components.

   Note:
   When you set up Configuration Hub, by default, a system and a data store are created. You can add more systems and data stores as needed.

4. For a horizontally scalable system, you can choose to set up high availability *(on page 1086)*.
5. As needed, create an object model *(on page 1090)*.
6. Specify the tags for data collection *(on page 1077)*.

After you perform these initial steps, data is collected and stored in the Historian server. You can then retrieve and analyze the data.

Setting up Configuration Hub

About Setting up Configuration Hub

To set up Configuration Hub, you must perform the following steps:

1. Install the Historian server *(on page 1024)*.
   - For a stand-alone Historian server, install single-server Historian.
   - For a horizontally scalable Historian server, install the mirror primary server and distributed/mirror servers.
2. Install Web-based Clients *(on page 1033)*.

3. Install collectors *(on page 1050)*.
4. Perform the post-installation tasks *(on page 1054)*.

If you want to upgrade Configuration Hub, refer to Upgrade Configuration Hub *(on page 1055)*.

After you install or upgrade the required components, you can access Configuration Hub *(on page 1055)*.

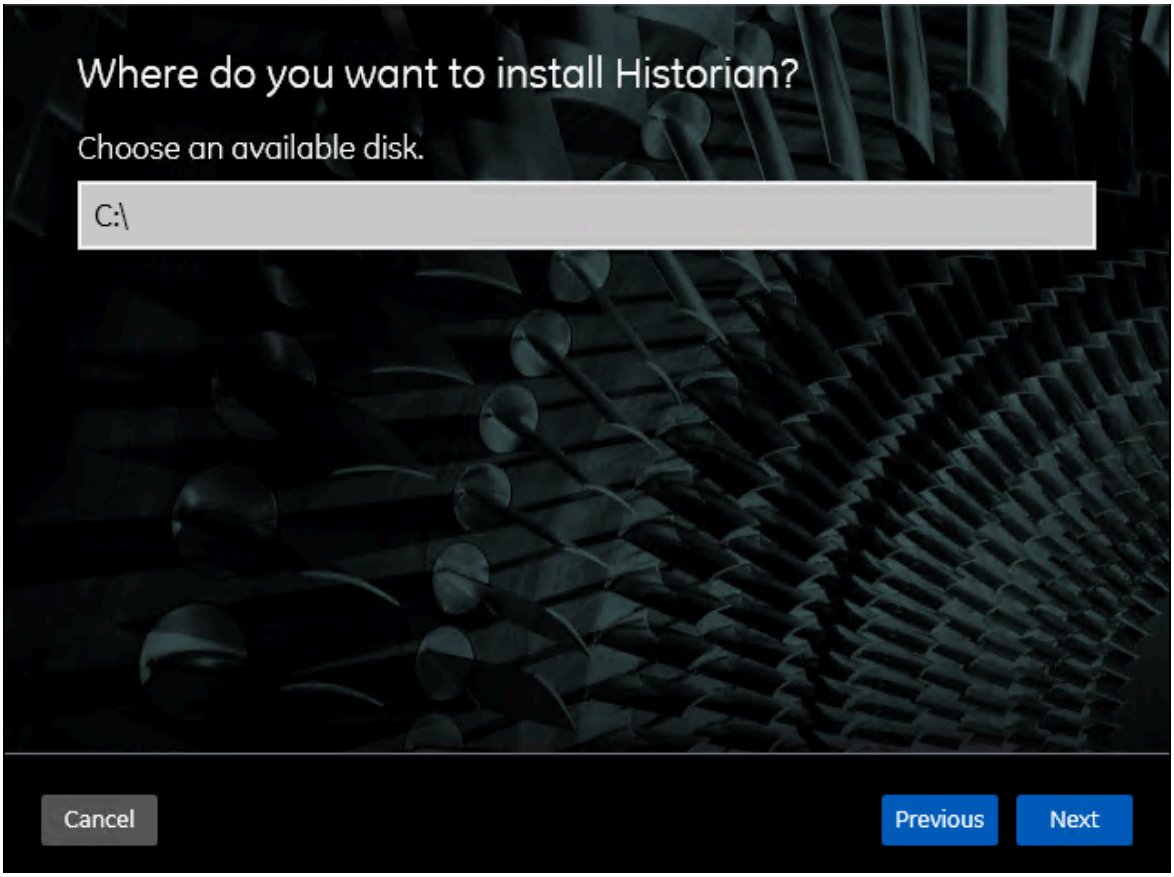
Install the Historian Server Using the Installer

- set up the Historian environment.
- If you want to install web-based clients and view Historian license information on Configuration Hub, you must provide the Configuration Hub and Proficy Authentication server details during installation. Therefore, ensure that you have already set up Proficy Authentication in Configuration Hub. For more information on setting up Proficy Authentication in Configuration Hub, refer to https://www.ge.com/digital/documentation/confighub/version2024/t_authentication_setup.html.
- If you are changing the role of a Historian server that was previously a distributed/mirror server to any other configuration (single-server or mirror primary server), you must first uninstall Historian.
- If you are installing a distributed/mirror server, use the same configuration, license key, installation drive, Proficy Authentication instance, and domain as the primary server.

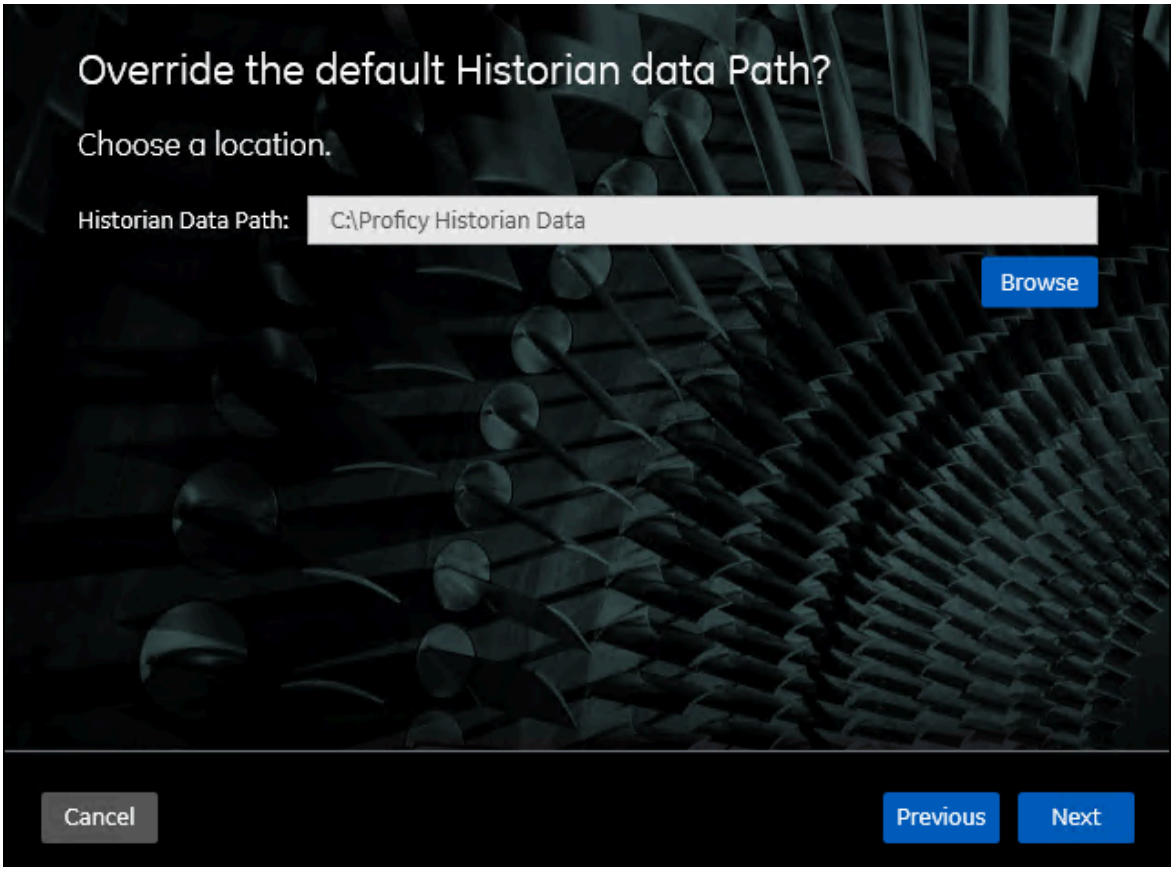
This topic describes how to install the Historian server using the installer.

You can also install it at a command prompt.

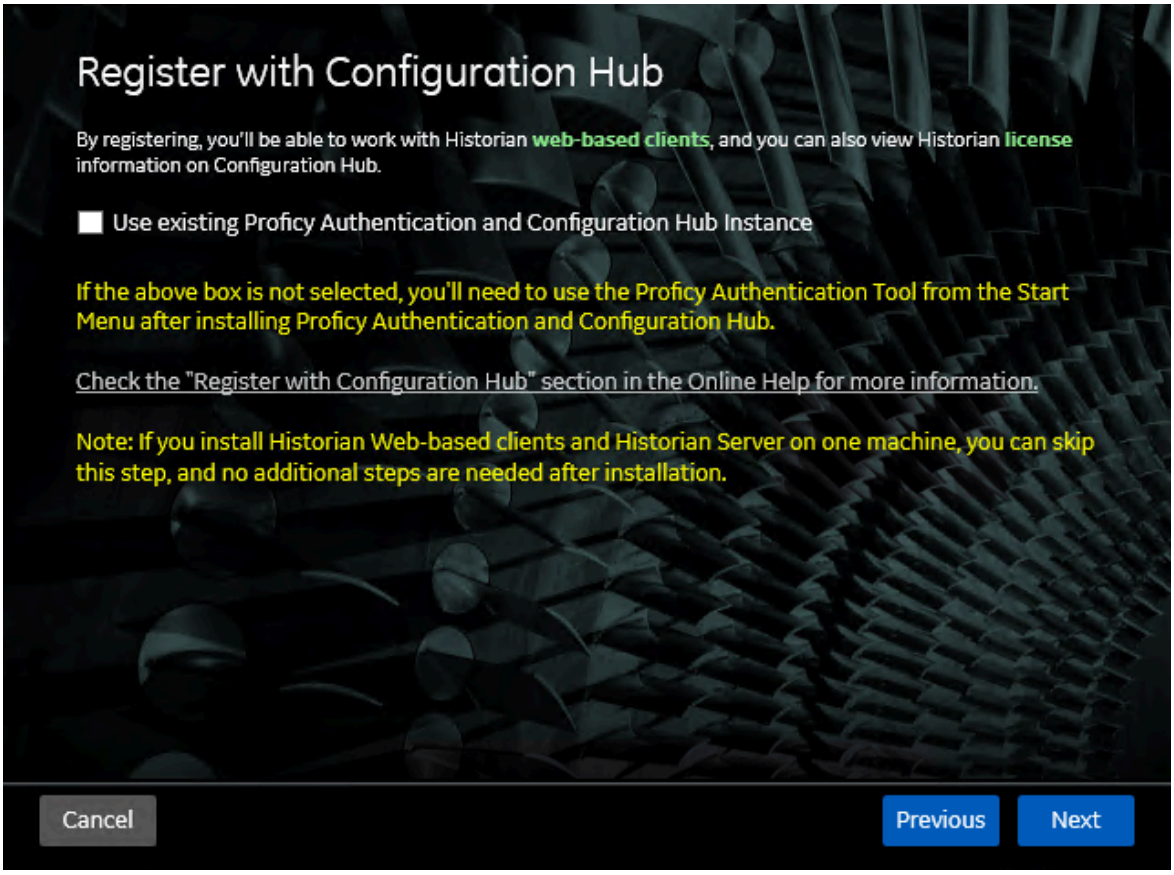
1. Log in as an administrator to the machine on which you want to install the Historian server.
2. Run the `InstallLauncher.exe` file.
3. Select **Install Historian Server**.
   The welcome page appears.
4. Select **Next**.
   The license agreement appears.
5. Select the **Accept** check box, and then select **Next**.
   The **Where do you want to install Historian?** page appears.



6. If needed, change the default installation drive of the Historian server, and then select **Next**.
   The **Override the default Historian data Path?** page appears.



7. If needed, change the default folder of the log files, and then select **Next**. If you want to include the Historian server in a cluster, enter the path to the shared folder of the cluster.
   The **Register with Configuration Hub** page appears.



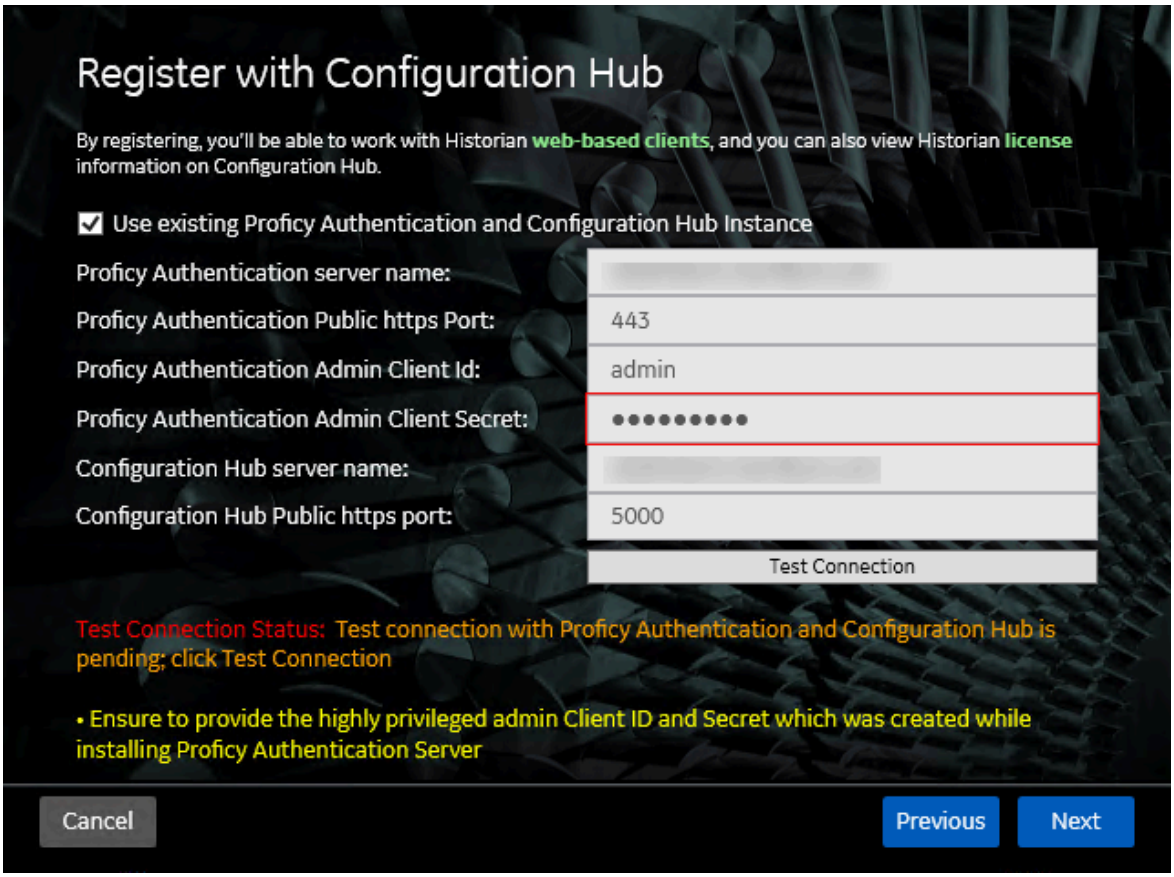
8. Select the **Use existing Proficy Authentication and Configuration Hub Instance** check box, and provide values as described in the following table.

   This step is needed only in the following cases:
   - The Historian Server and the Web-based clients will be on two different machines.
   - You already installed Proficy Authentication and Configuration Hub, and you want to use the Historian Web-based clients and view the Historian license information on Configuration Hub.

     If you do not select the **Use existing Proficy Authentication and Configuration Hub Instance** during the installation, to use the Historian Web-based clients and view the Historian license information on Configuration Hub, you must use the Proficy Authentication Tool from the Start menu to register with Proficy Authentication and Configuration Hub servers.

     If you do not have Proficy Authentication and Configuration Hub installed, and you intend to use the Historian Web-based clients and view the Historian license information on Configuration Hub, you can install them while installing the Web-based clients.

Note:
Proficy Authentication is required for user authentication. It provides identity-based security for applications and APIs. It supports open standards for authentication and authorization, including Oauth2.



Field	Description
Proficy Authentication server name	Enter the name of the machine on which the Proficy Authentication server is installed. If the machine uses a fully qualified domain name (FQDN), provide the FQDN. By default, the local hostname is considered.
Proficy Authentication Public https port	Enter the port number used by the Proficy Authentication service. The default value is 443. Ensure that this port number matches the one

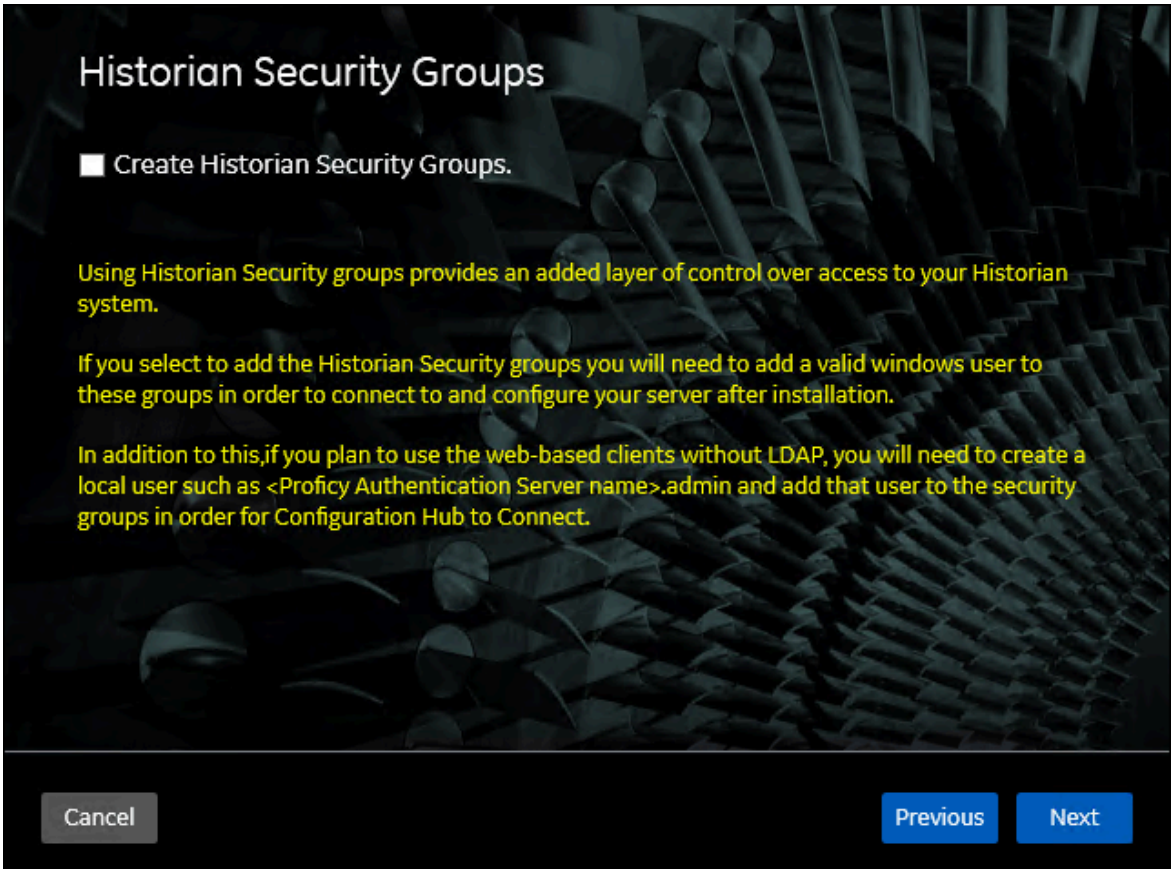
Field	Description
	on the **TCP Port Assignments** page during Web-based Clients installation.
Proficy Authentication Admin Client Id	The client ID to connect to the Proficy Authentication service.
Proficy Authentication Admin Client Secret	The password to connect to the Proficy Authentication service.
Configuration Hub server name	The server name or the FQDN of the existing Configuration Hub server, as displayed in the address bar of the browser when you access Configuration Hub from the machine where Configuration Hub is installed.
Configuration Hub Public https port	The web server (https) port that you want to use for Configuration Hub. By default, it is 5000.
Test Connection	Option to test the status of the connection with external Proficy Authentication server.

Note:
If you change the Proficy Authentication server for Web-based Clients later, you must also change the Proficy Authentication server for the Historian server. This can be done using the Proficy Authentication Configuration Tool located at `<Install Drive>:\Program Files\Proficy\Proficy Historian\x64\Server` without the need to install the Historian server again. Alternatively, you can search for the Proficy Authentication Tool in the Windows search bar and open it.

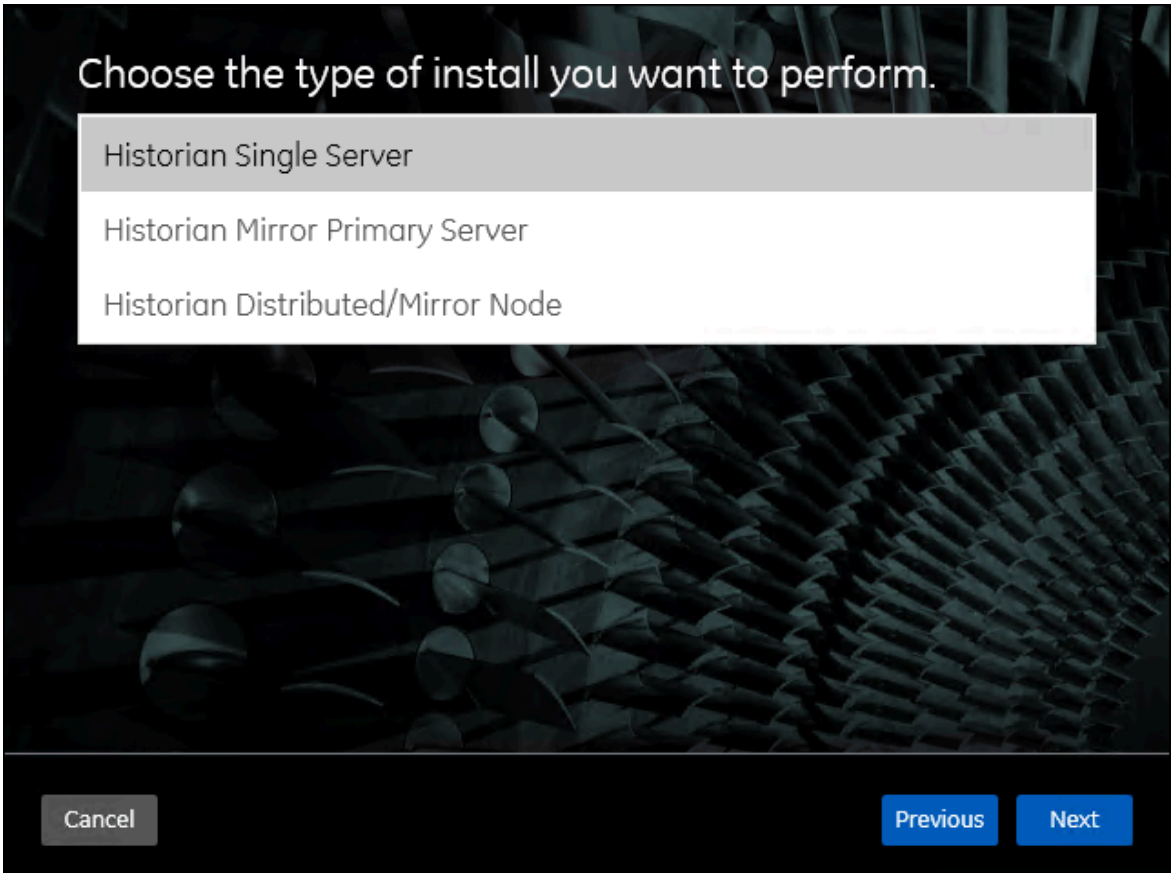
9. Select **Next**.
   The **Historian Security Groups** page appears.

   Using Historian security groups provides an added layer of control over access to your Historian system.

   By default, the option to create Historian security groups is not selected.

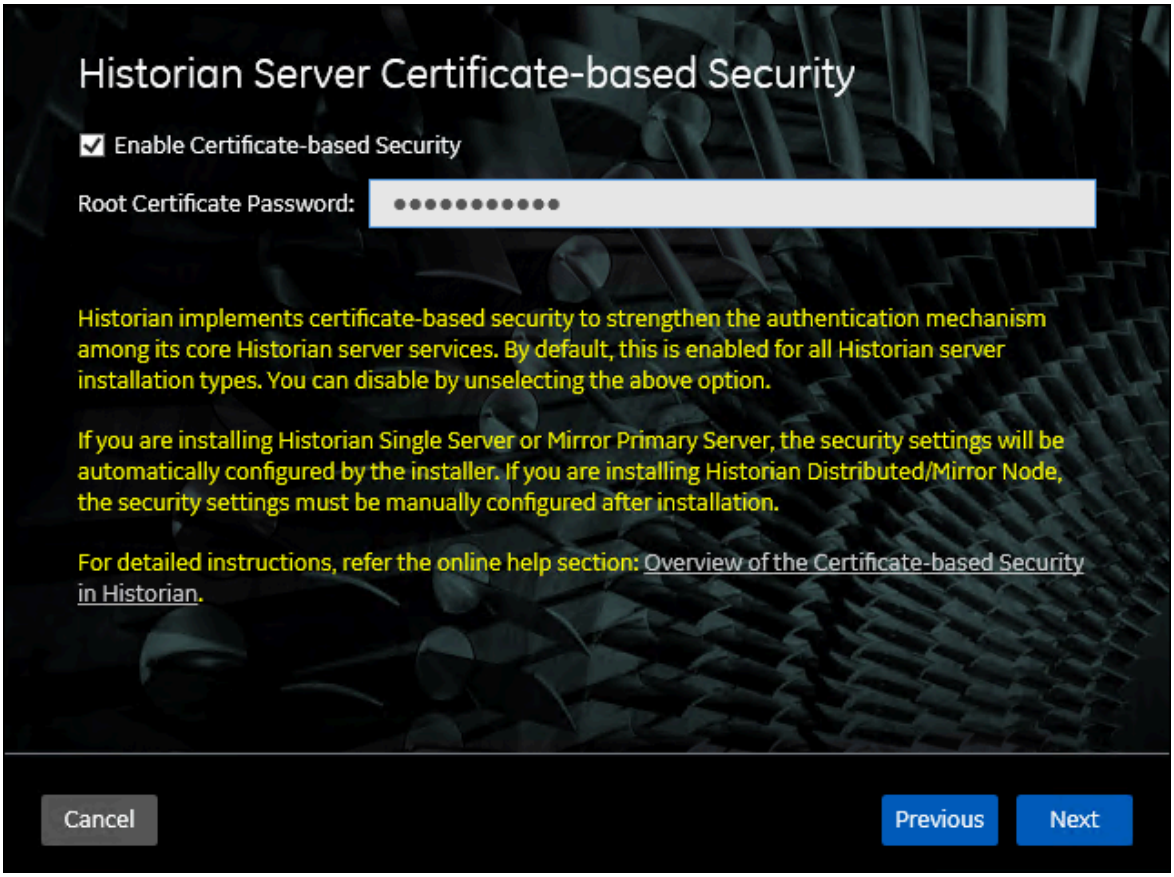


10. If you want the installer to create Historian security groups *(on page)*, select the corresponding check box, and then select **Next**.
    The **Choose the type of install you want to perform** page appears.



11. Select the type of the Historian server that you want to install, and then select **Next**.
    - **Historian Single Server**: This is for a stand-alone Historian system, which contains only one Historian server. This type of system is suitable for a small-scale Historian setup.
    - **Historian Mirror Primary Server**: This is for a horizontally scalable Historian system, which contains multiple Historian servers, all of which are connected to one another. Installing this server will allow you to add machines and distributed/mirror servers to this system.
    - **Historian Distributed/Mirror Node**: This is for a horizontally scalable Historian system. Installing this server will allow you to add this node to a primary server.

    The **Historian Server Certificate-based Security** page appears.



12. If you want to enable certificate-based security (MTLS-based security), leave the **Enable Certificate-based Security** check box selected, and then enter **Root Certificate Password**.

    Note:
    Ensure to use the same password to create MTLS (client) certificates. For more information on creating MTLS (client) certificates, refer to Generate MTLS certificate.

    For more information on certificate-based security, refer to overview of the Certificate-based Security in Historian *(on page)*.

    Warning:
    If you do not select the **Enable Certificate-based Security** check box during the installation, you must generate the root certificates manually, as described in the Manually Install Certificates for Historian section. However, this is not recommended.

13. Select **Next**.
    The **You are ready to install** page appears.

14. Select **Install**.
    The installation begins.
15. After the installation, when you are asked to reboot your system, select **Yes**.
    The Historian server is installed on your machine in the following folder: `<installation drive>:\Program Files\Proficy\Proficy Historian\x64\Server`, and the following registry path is created: `HKEY_LOCAL_MACHINE\SOFTWARE\Intellution, Inc.\iHistorian\Services`.

    In addition, the following components are installed:
    - **The RemoteCollectorConfigurator utility:** A command-line tool, which allows you to manage collectors remotely. By default, it is located in the `C:\Program Files\GE Digital\NonWebCollectorInstantiationTool` folder. For instructions on using this utility, refer to About Installing and Managing Collectors Remotely.
    - **The Proficy Authentication Configuration tool:** A utility that allows you to specify the Proficy Authentication server details to match with the Proficy Authentication server used by Web-based Clients. By default, it is located in the `C:\Program Files\Proficy\Proficy Historian\x64\Server` folder. For instructions on using this tool, refer to Register with Configuration Hub *(on page)*.

Install Web-based Clients Using the Installer

1. Install the Historian server *(on page 1024)*. During the installation, in the **Register with Configuration Hub** page, select the **Use existing Proficy Authentication and Configuration Hub Instance** check box, and the provide the Proficy Authentication server and Configuration Hub server details.

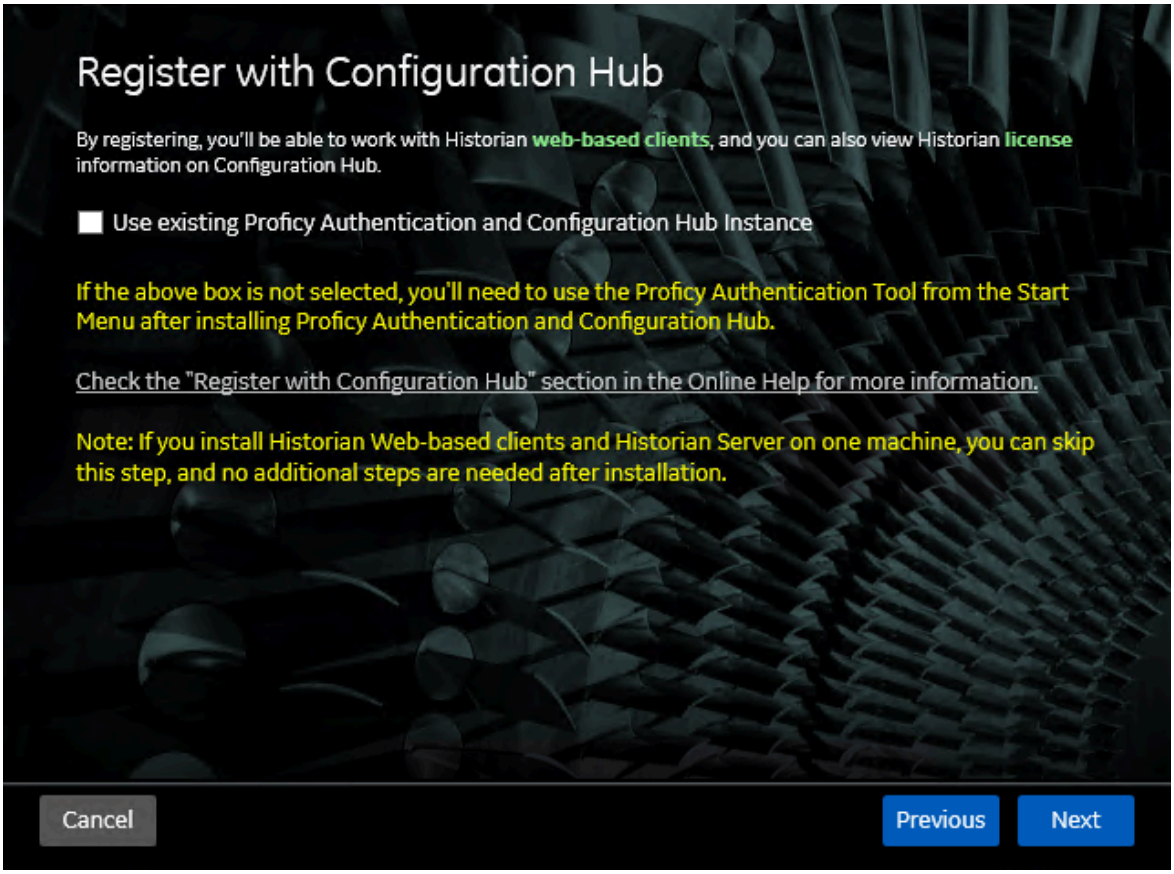
Note:

This step is needed only in the following cases:

- The Historian Server and the Web-based clients will be on two different machines.
- You already installed Proficy Authentication and Configuration Hub, and you want use the Historian Web-based clients and view the Historian license information on Configuration Hub.

If you do not select the **Use existing Proficy Authentication and Configuration Hub Instance** during the installation, to use the Historian Web-based clients and view the Historian license information on Configuration Hub, you must use the Proficy Authentication Tool *(on page)* to register with Proficy Authentication and Configuration Hub servers.

If you do not have Proficy Authentication and Configuration Hub installed, and you intend to use the Historian Web-based clients and view the Historian license information on Configuration Hub, you can install them while installing the Web-based clients.



2. If you want to use Web-based Clients in a cluster environment, ensure that your network is enabled for multicast traffic, and set up high availability on each node in the cluster.

This topic describes how to install Web-based Clients using a GUI-based installer.

You can also install Web-based Clients using the command line.

During the installation, you can choose to use Web-based Clients in a cluster environment, thus ensuring high availability of connection to the Historian server using the client applications.

1. Run the `InstallLauncher.exe` file.
2. Select **Install Web-based Clients**.

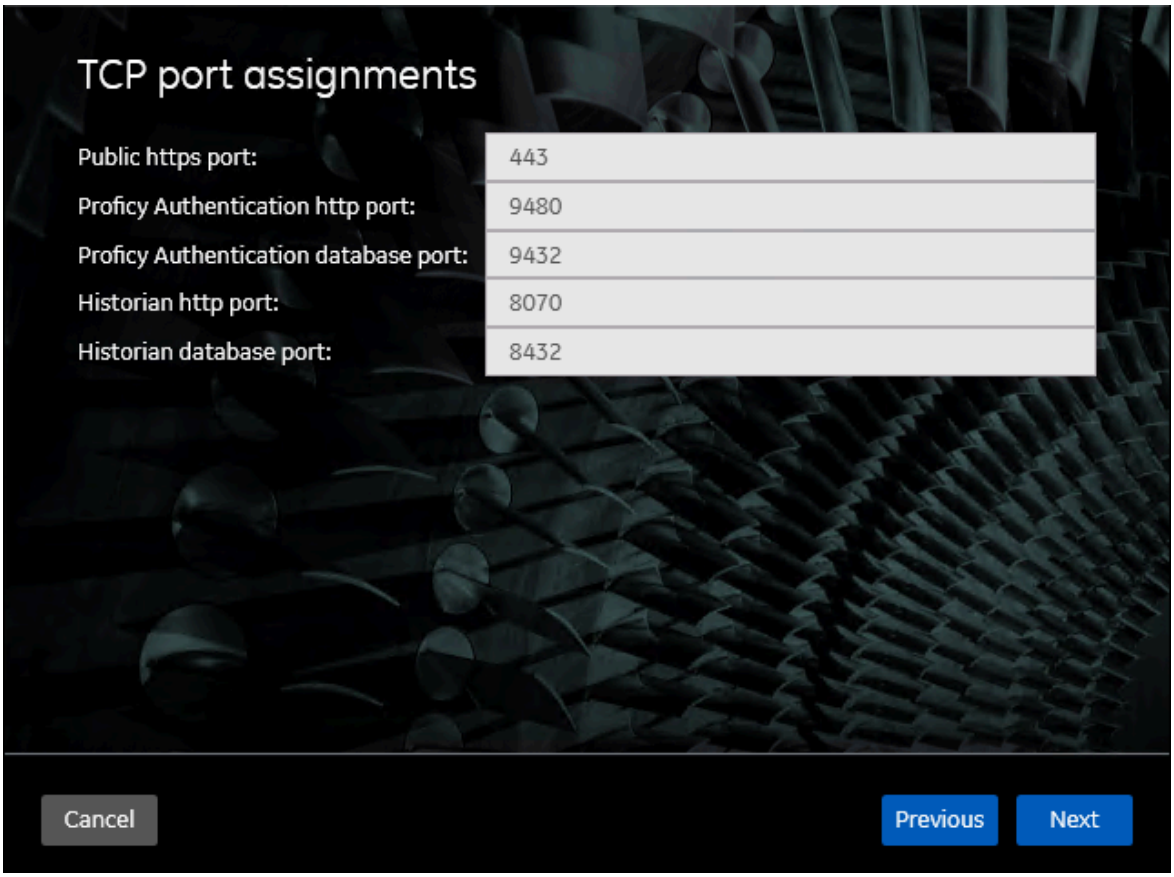
The welcome page appears.

3. Select **Next**.

   The license agreement appears.

4. Select the **Accept** check box, and then select **Next**.

   The **TCP port assignments** page appears.



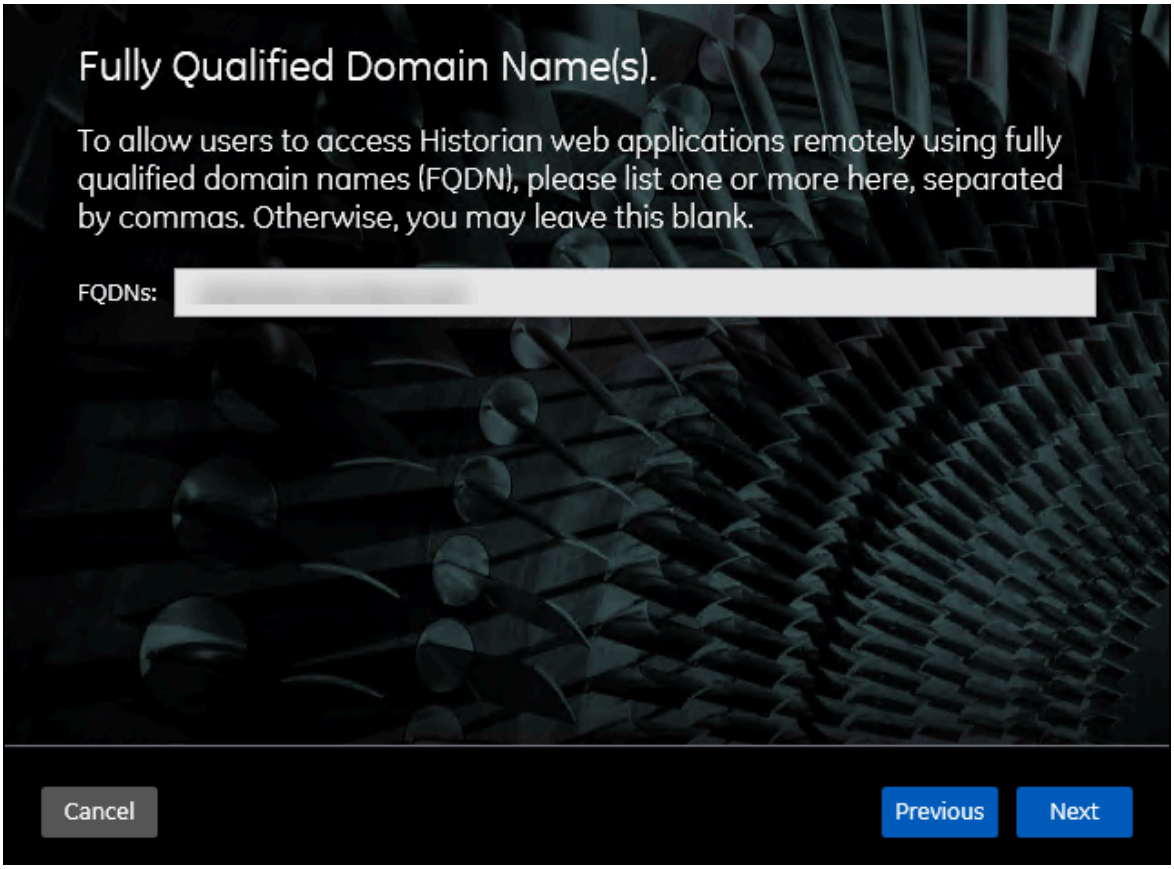
5. As needed, change the values for TCP port assignments as described in the following table, and then select **Next**.

Field	Description
Public https port	Port for https protocol communication used by Web-based Clients (through a firewall). The default value is 443. Ensure that this port number matches the one you specify while installing the Historian server. In addition: ◦ If you will install Operations Hub later on the same machine, the value that you provide in this field is populated while installing Operations Hub. ◦ If you have already installed Operations Hub on the same machine, this field is disabled and populated with the value you have provided while installing Operations Hub.

Field	Description
Proficy Authentication http port	Port for http protocol communication used by the Proficy Authentication service. The default value is 9480.
Proficy Authentication database port	Port for the Proficy Authentication database. The default value is 9432.
Historian http port	Port for the http protocol communication used by Web-based Clients. The default value is 8070.
Historian database port	Port for the PostgreSQL Historian database. The default value is 8432.

The **Fully Qualified Domain Name(s)** page appears.

- If you will install Operations Hub later on the same machine, the value that you provide in the **FQDNs** field is populated while installing Operations Hub.
- If you have already installed Operations Hub on the same machine, the **FQDNs** field is disabled and populated with the value you have provided while installing Operations Hub.



6. In the **FDQNs** field, enter the fully qualified domain names, and then select **Next**.
   This enables you to access Historian web applications remotely. You can use it to access the Web Admin console using alias names. Enter the values separated by commas.
   To access the Web Admin console using any of the following URLs, enter `Test.abc.ge.com,localhost,127.0.0.1,aliasName`
   - https:// Test.abc.ge.com /historian-visualization/hwa
   - https:// 127.0.0.1 /historian-visualization/hwa
   - https:// aliasName /historian-visualization/hwa
   - https:// localhost /historian-visualization/hwa

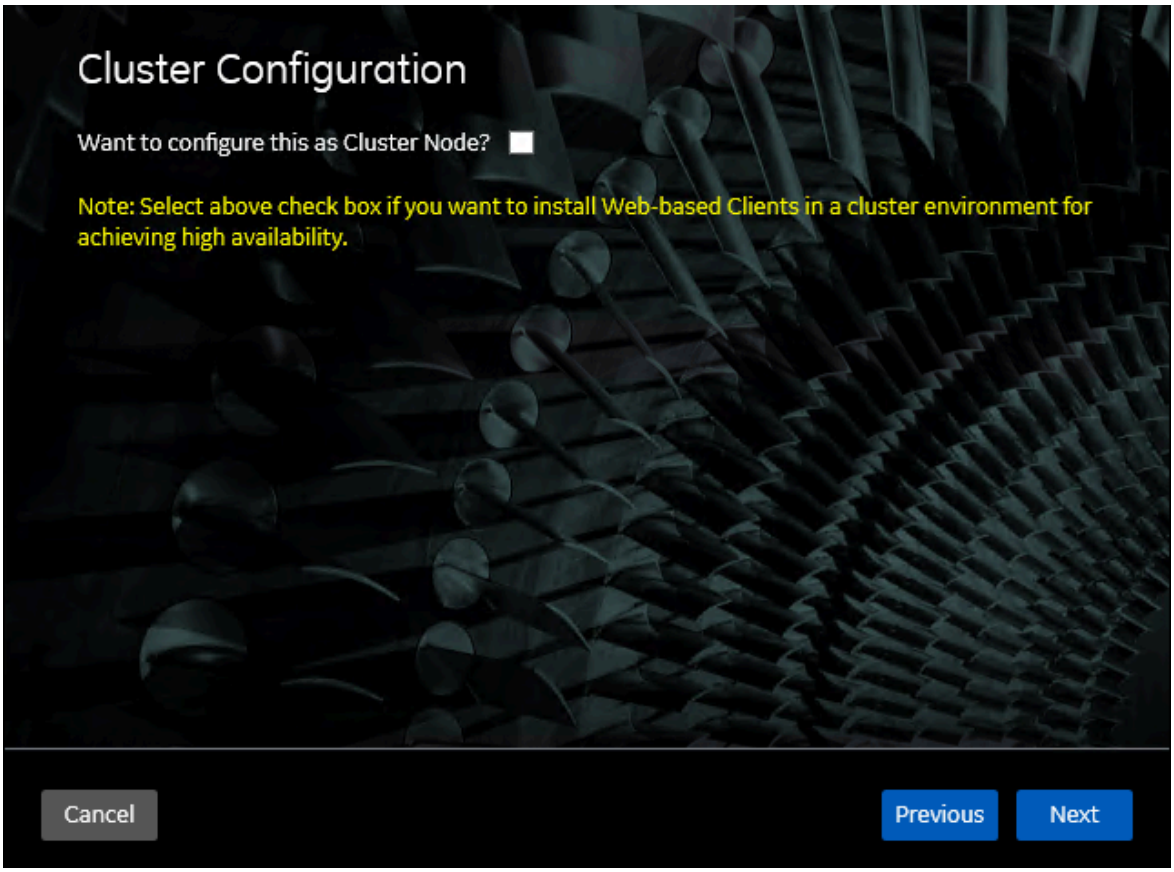
   Important:
   - Do not enter a space between the values.
   - You must add the IP address and alias name in the `hosts` file located at `C:\Windows\System32\drivers\etc`. The IP address that you add must be a static or fixed IP address.

     Format: `<IP address> <alias name>`

Example: `1.2.3.4 myservername`

- FQDN is not supported for Configuration Hub.

The **Cluster Configuration** page appears.



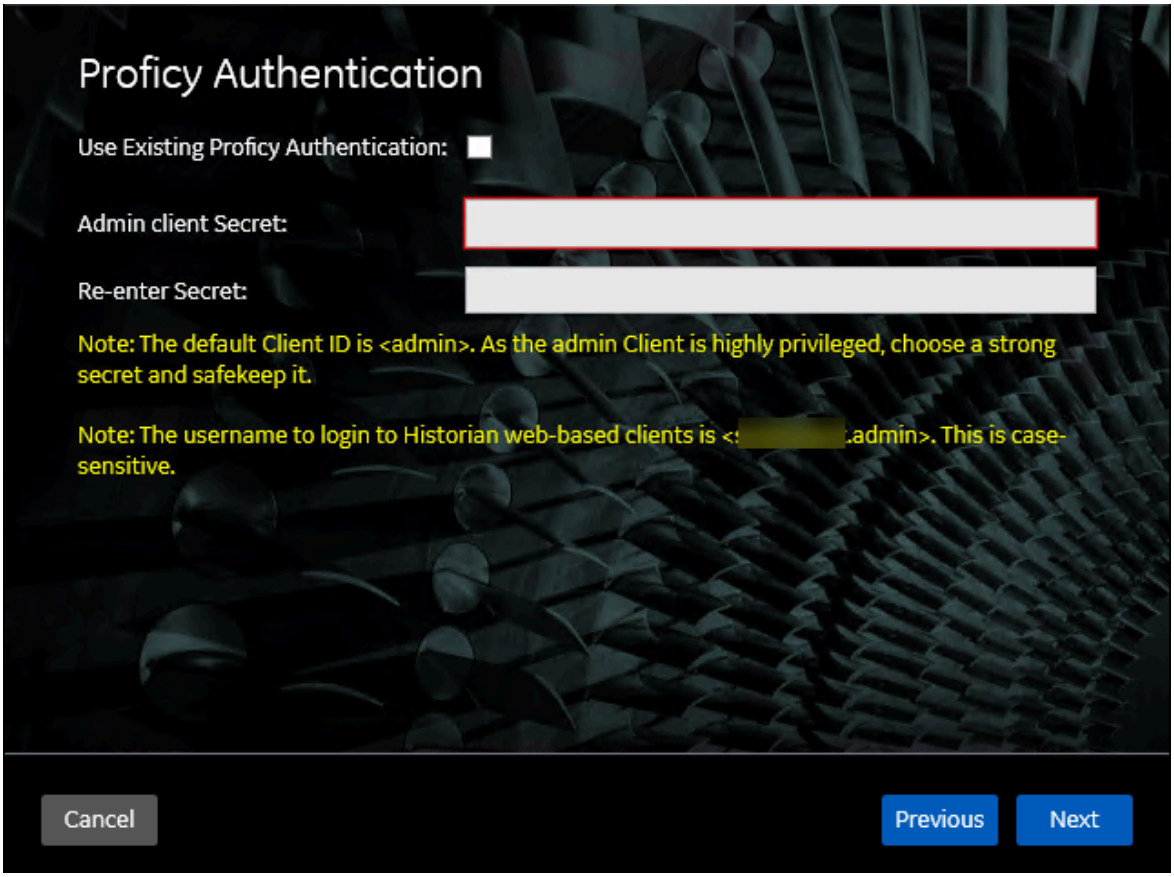
If, however, you are upgrading Web-based Clients, this page does not appear. In that case, skip the next step.

7. If you want high availability of Web-based Clients, select the **Cluster Node** check box, and enter values as described in the following table.

Field	Description
Historian Database Folder	Provide the database folder in the shared drive that you have created. The default value is `C:\ProgramData\GE\OperationsHub`. You *must* change this value.

Field	Description
Cluster FQDN	Enter the client access point of the role for which you have added the resources while setting up high availability *(on page)*.
Multicast Address	If needed, modify the common IP address that all the nodes in the cluster can use. Enter a value between 224.0.0.0 and 239.255.255.255 (or a hostname whose IP address falls in this range).The default value is 228.0.0.4.
Historian Cluster Membership Port	If needed, modify the common port number that all the nodes in the cluster can use. The default value is 45564. This port number, in conjunction with the multicast address, is used to create the cluster.
Historian Cluster Receiver Port	If needed, modify the multicast port number that you want to use for incoming Historian data. The default value is 4000.

8. Select **Next**.
   The **Proficy Authentication** page appears, allowing you to choose whether you want to install Proficy Authentication along with Web-based Clients installation or use an existing Proficy Authentication.



- If you want to install Proficy Authentication, clear the **Use Existing Proficy Authentication** check box. If you want to include Proficy Authentication in the cluster, you must install Proficy Authentication locally on each cluster node.
- If you want to use an existing Proficy Authentication server, select the **Use Existing Proficy Authentication** check box. Proficy Authentication is detected if you installed it using a unified installer or Operations Hub, or if Historian uses Proficy Authentication installed remotely from an earlier version.

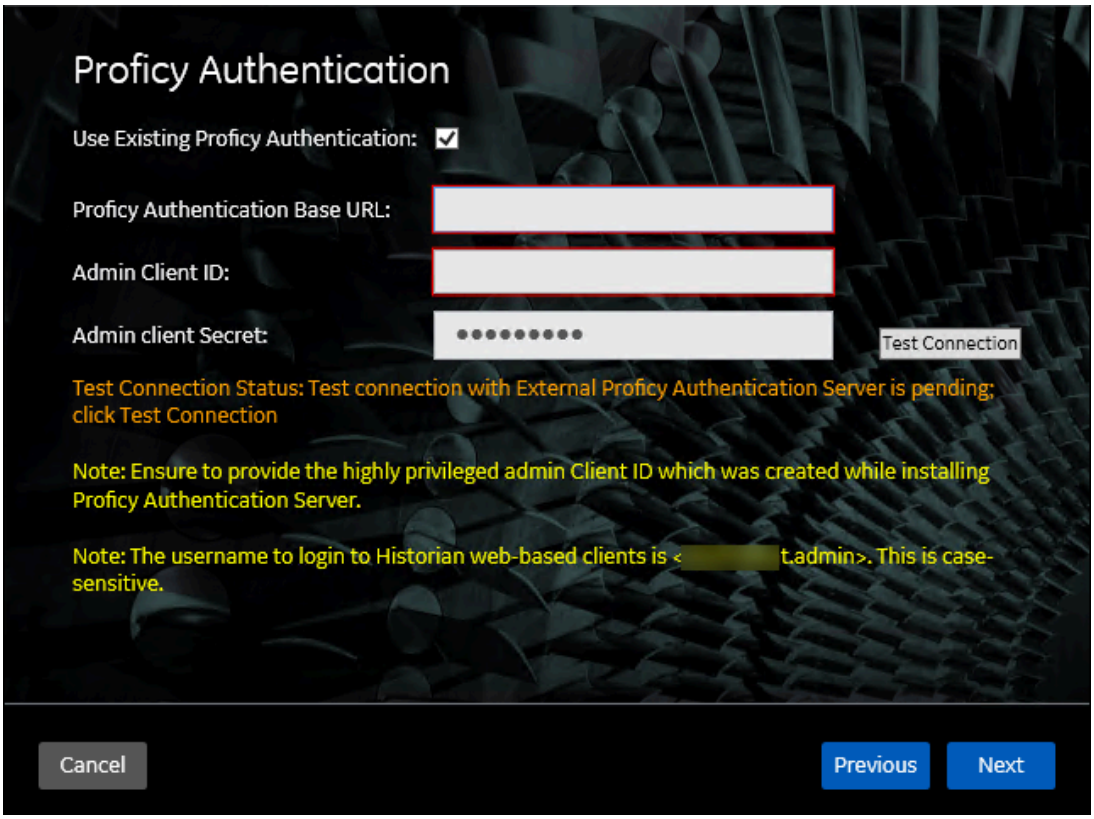
9. If you want to install Proficy Authentication, enter the **Admin client secret**, re-enter the secret, and then select **Next**.
   The admin client secret must satisfy the following conditions:
   - Must not contain only numbers.
   - Must not begin or end with a special character.
   - Must not contain curly braces.

Note:
The format of username for Historian Web-based Clients is <host name>.admin, where <host name> is the machine on which Web-based Clients are installed. And, the default client ID is admin. Both the host name and client ID are case-sensitive.

If, however, the Proficy Authentication server hostname is long, resulting in a username longer than 20 characters, Windows does not allow you to create the user. In that case, you can create a Proficy Authentication user, and then create the corresponding Windows user, using the uaa_config_tool utility.

10. Alternatively, if you want to use an existing Proficy Authentication service (that is, a Proficy Authentication instance already installed by an external application such as Operations Hub):

    a. Select the **Use Existing Proficy Authentication** check box.
    The fields for the existing Proficy Authentication service appear.

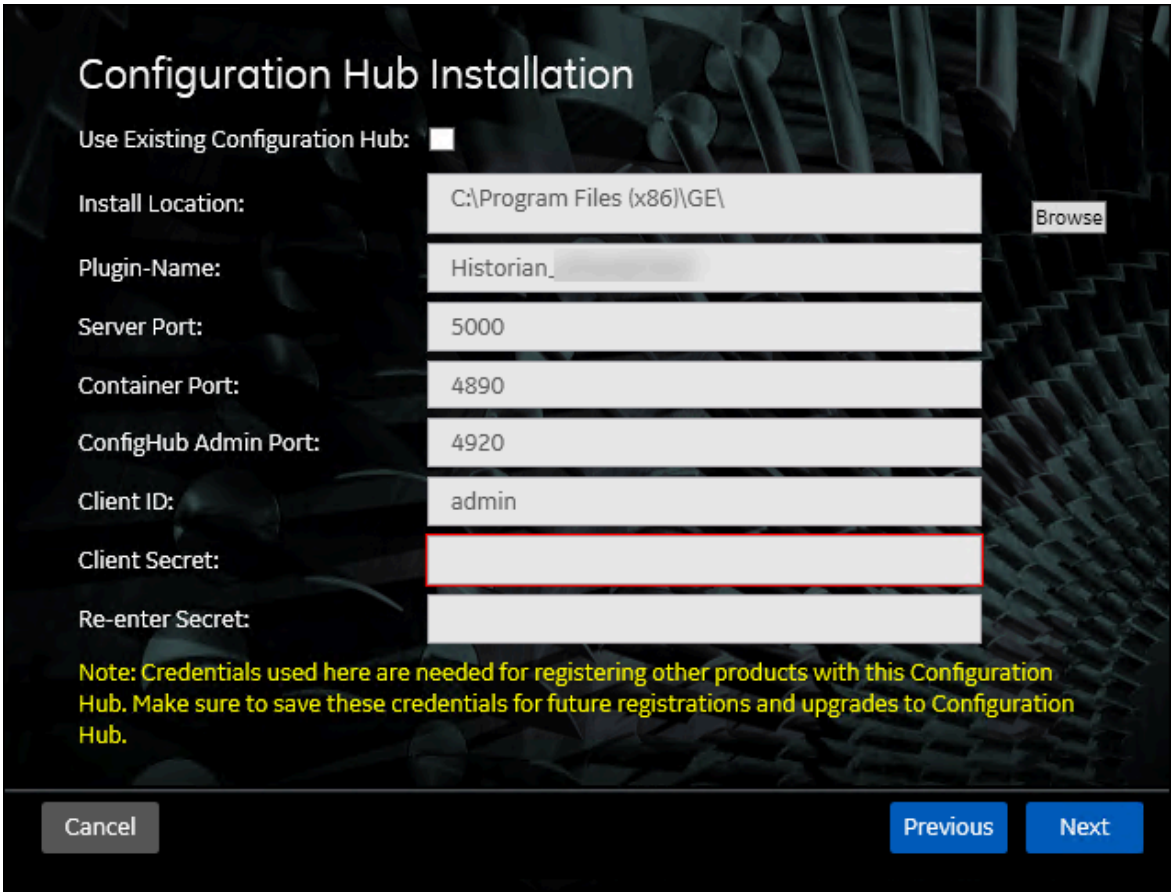


    b. Enter values as described in the following table.

Field	Description
Proficy Authentication Base URL	Enter the URL of the external Proficy Authentication server in the following format: https://<*Proficy Authentication server name*>:<*port number*>, where <*Proficy Authentication server name*> is the FQDN or hostname of the machine on which Proficy Authentication is installed. By default, the port number is 443. **Note:** Do not enter a trailing slash character.
Admin Client ID	Enter the client name that you provided while installing the external Proficy Authentication. The default value is admin.
Admin Client Secret	Enter the client secret that you provided while installing the external Proficy Authentication.

c. Select **Test Connection**.
The results of the connection test appear. You cannot proceed until the connection is successful.

11. Select **Next**.
The **Configuration Hub Installation** page appears, allowing you to choose whether you want to install Configuration Hub along with Web-based Clients or use an existing Configuration Hub.



Configuration Hub allows you to add and manage a collector instance remotely. For more information, refer to About Configuration Hub.

If, however, an earlier version of Configuration Hub is available on the same machine, you will be prompted to enter the details of the existing Configuration Hub, and it will be upgraded to the latest version. If that happens, skip the next step.

Important:
By default, Configuration Hub points to the same Proficy Authentication server as the one you provided during the Historian server installation. If you want to install Web-based Clients in a cluster environment, ensure that:

- Configuration Hub does not use the same Proficy Authentication server as that used by the cluster.
- The Proficy Authentication and Configuration Hub details must be the same for all cluster nodes.

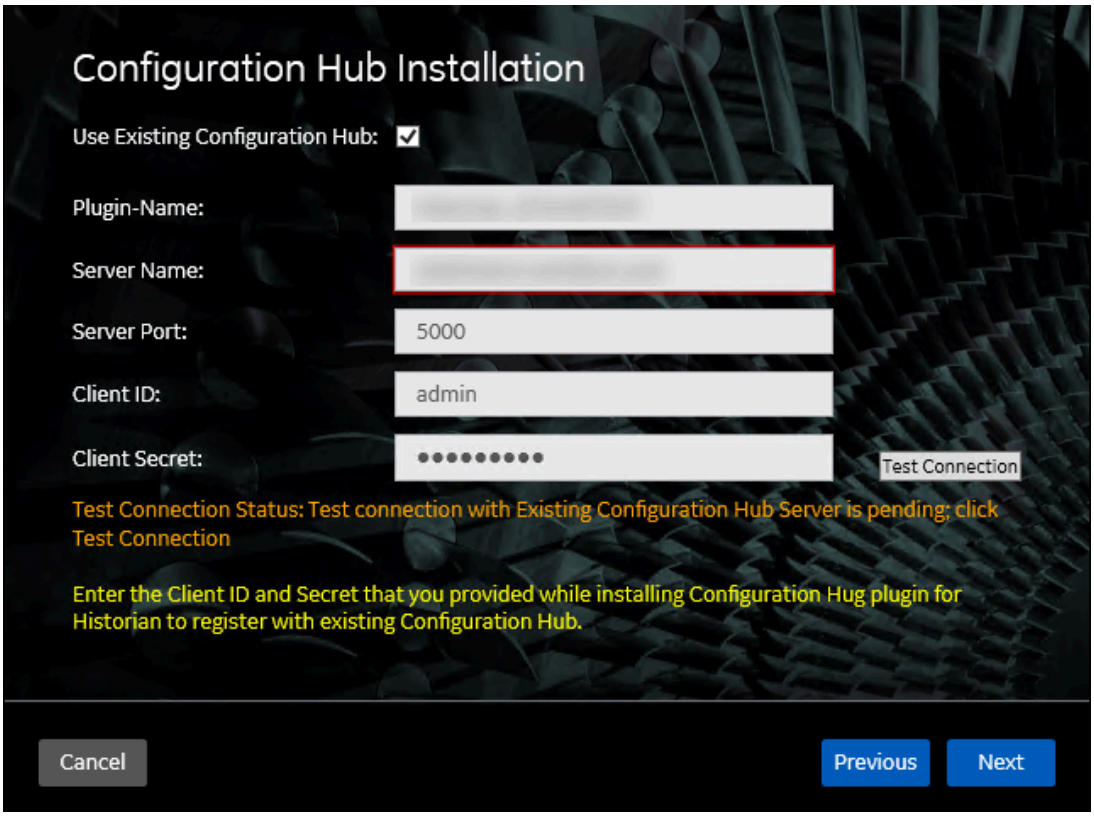
12. If you want to install Configuration Hub, ensure that the **Use Existing Configuration Hub** check box is cleared, and then provide values as described in the following table.

Field	Description
Install Location	If needed, modify the installation folder for Configuration Hub.
Plugin Name	If needed, modify the name of the Configuration Hub plugin for Historian. The default value is in the following format: Historian_<*host name*>. If, however, you are installing Web-based Clients in a cluster environment, the default value is Historian_<*cluster name*>. You can modify this value, but provide the same value for all the nodes in the cluster.
Server Port	If needed, modify the port number that you want to use for the web server. The default value is 5000. If you want to install Web-based Clients in a cluster environment, provide the same value for all the nodes in the cluster.
Container Port	If needed, modify the port number for the Configuration Hub container. The default value is 4890.
ConfigHub Admin Port	This is the port number of the Configuration Hub admin. The default value is 4890. If needed, you can change the port number.
Client ID	Enter the username to connect to Configuration Hub. The default value is admin. The value that you enter can contain: ◦ All English alphanumeric characters (ABCDEFGHIJKLMNOPQRSTUVXYZ abcdefghijklmnopqrstuvwxyz_-0123456789) ◦ The following special characters: ><:~!@#$%^&*?|

Field	Description
Client Secret	Enter the password to connect to Configuration Hub. The value that you enter can contain: ◦ Must contain at least eight characters. ◦ All English alphanumeric characters (ABCDEFGHIJKLMNOPQRSTUVXYZ abcdefghijklmnopqrstuvwxyz_-0123456789) ◦ The following special characters: ><:~!@#$%^&*?|
Re-enter Secret	Re-enter the password to connect to Configuration Hub.

13. Alternatively, if you want to use an existing Configuration Hub:

    a. Select the **Use Existing Configuration Hub** check box. This check box is disabled if an existing Configuration Hub is detected.
    The fields for the existing Configuration Hub appear.

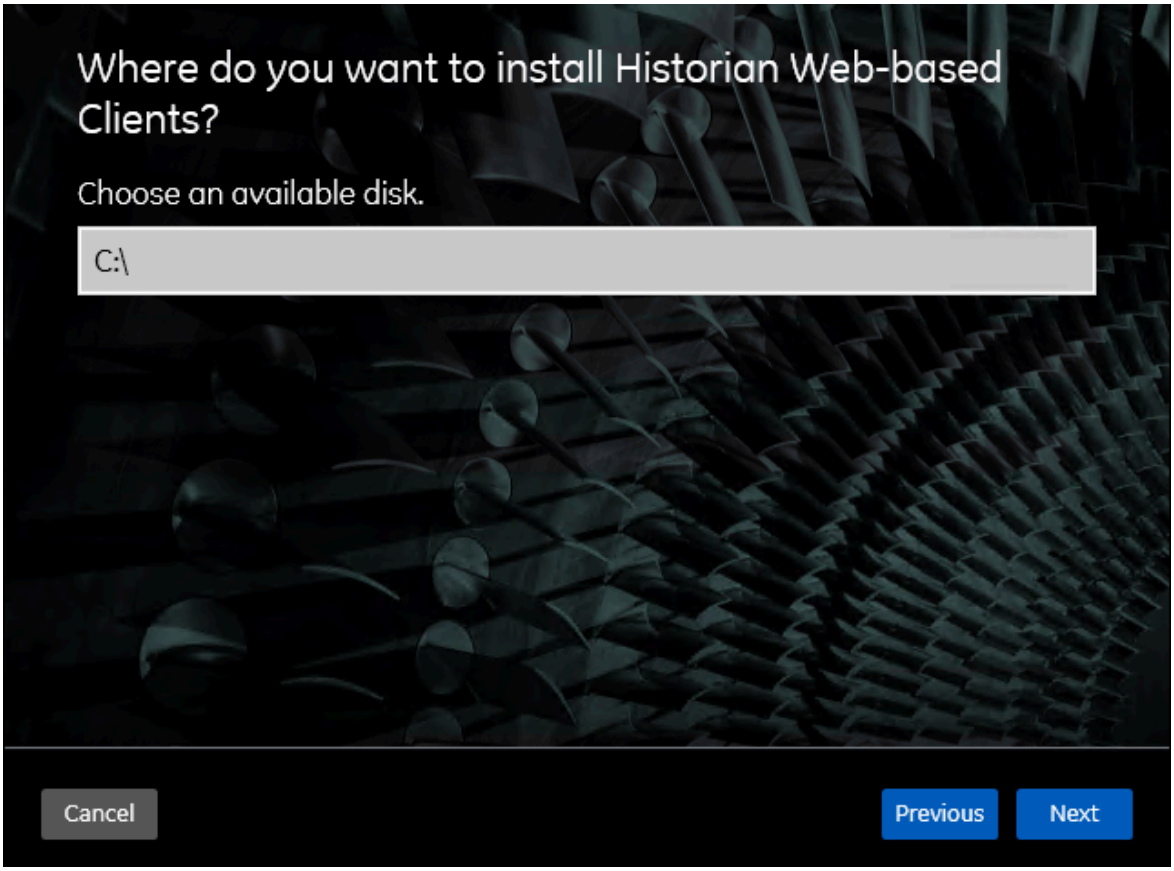


b. Provide values as described in the following table.

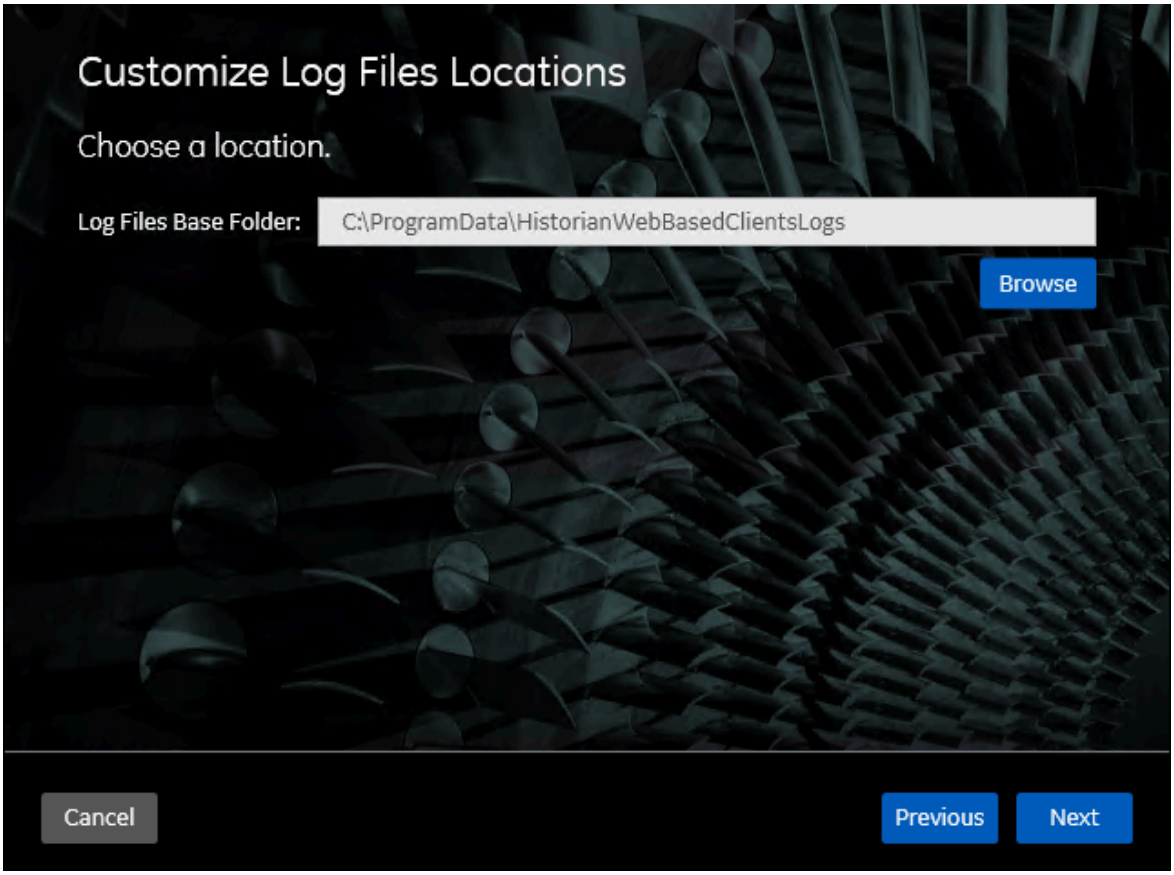
Field	Description
Plugin Name	If needed, modify the name of the Configuration Hub plugin for Historian. The default value is in the following format: Historian_-<*host name*>
Server Name	Enter the server name or the FQDN of the existing Configuration Hub server, as displayed in the address bar of the browser when you access Configuration Hub from the machine where Configuration Hub is installed.
Server Port	If needed, modify the port number that you want to use for the web server. The default value is 5000.
Client ID	If needed, modify the username to connect to Configuration Hub. The default value is admin.
Client Secret	Enter the password to connect to Configuration Hub.

c. Select **Test Connection**.
The results of the connection test appear. You cannot proceed until the connection is successful.

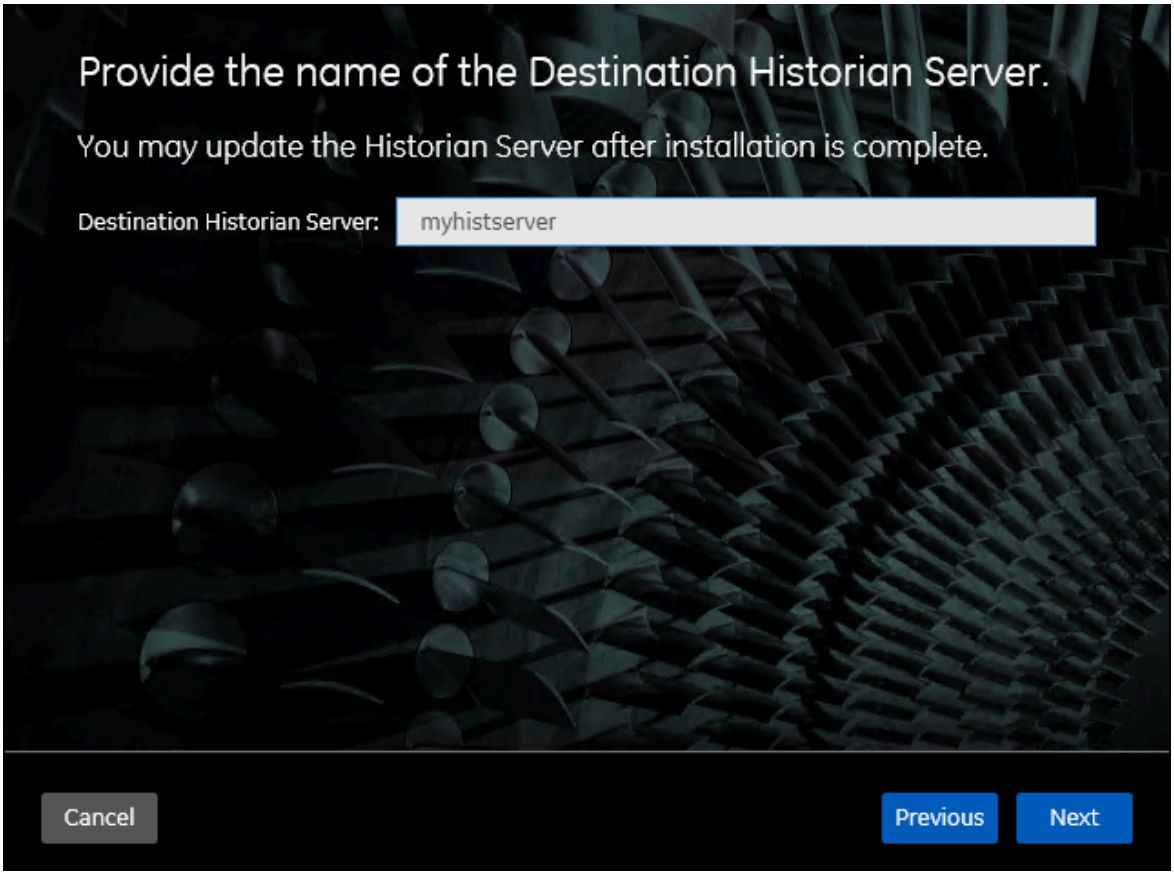
14. Select **Next**.
The default installation drive appears.



15. If needed, change the installation drive for Web-based Clients, and then select **Next**.
    The log files location page appears.



16. If needed, change the location for log files, and then select **Next**.
    The destination Historian server page appears.



17. Provide the name of the destination Historian server to which Web-based Clients are connected by default. When you login to Configuration Hub, the default system will point to this server.

> **Note:**
> - Provide the name of either Historian single-server or mirror primary server because the systems in Configuration Hub will be either a stand-alone system or a horizontally scalable system.
> - If you want to connect to a remote Historian server, you must disable the **Enforce Strict Client Authentication** and **Enforce Strict Collector Authentication** options using Historian Administrator in the remote server.

18. Select **Next**.
    The **You are ready to install** page appears.
19. Select **Install**.
    The Web-based Clients installation begins.
20. When you are prompted to reboot your machine, select **Yes**.

Historian Web-based Clients are installed in the following folder: `<installation drive>:\Program Files\GE`, and the following registry paths are created:

- `HKEY_LOCAL_MACHINE\SOFTWARE\GE Digital`
- `HKEY_LOCAL_MACHINE\SOFTWARE\GE`

If you want to use Configuration Hub installed using other products such as iFIX, Plant Applications, and so on, set up authentication to point to the Proficy Authentication instance.

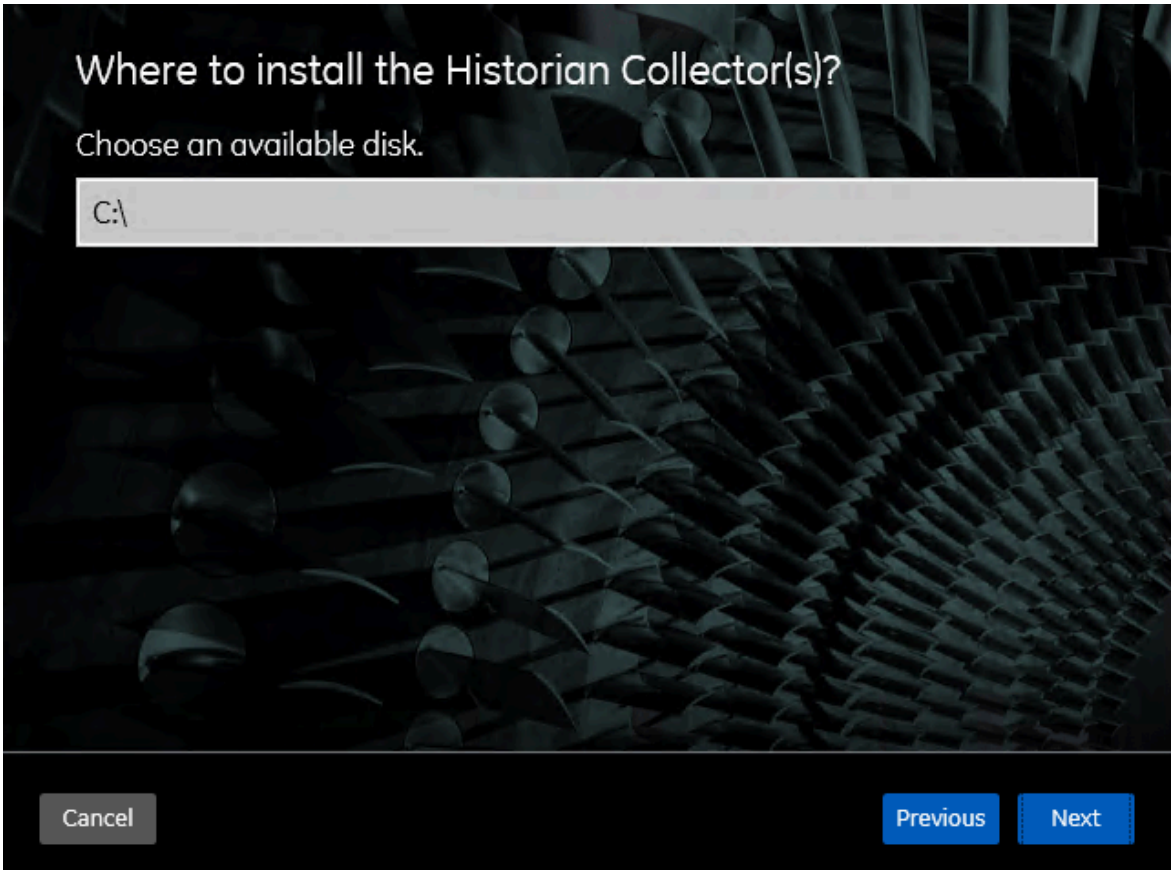
Install Collectors Using the Installer

After you install collectors, the following artefacts will be available:

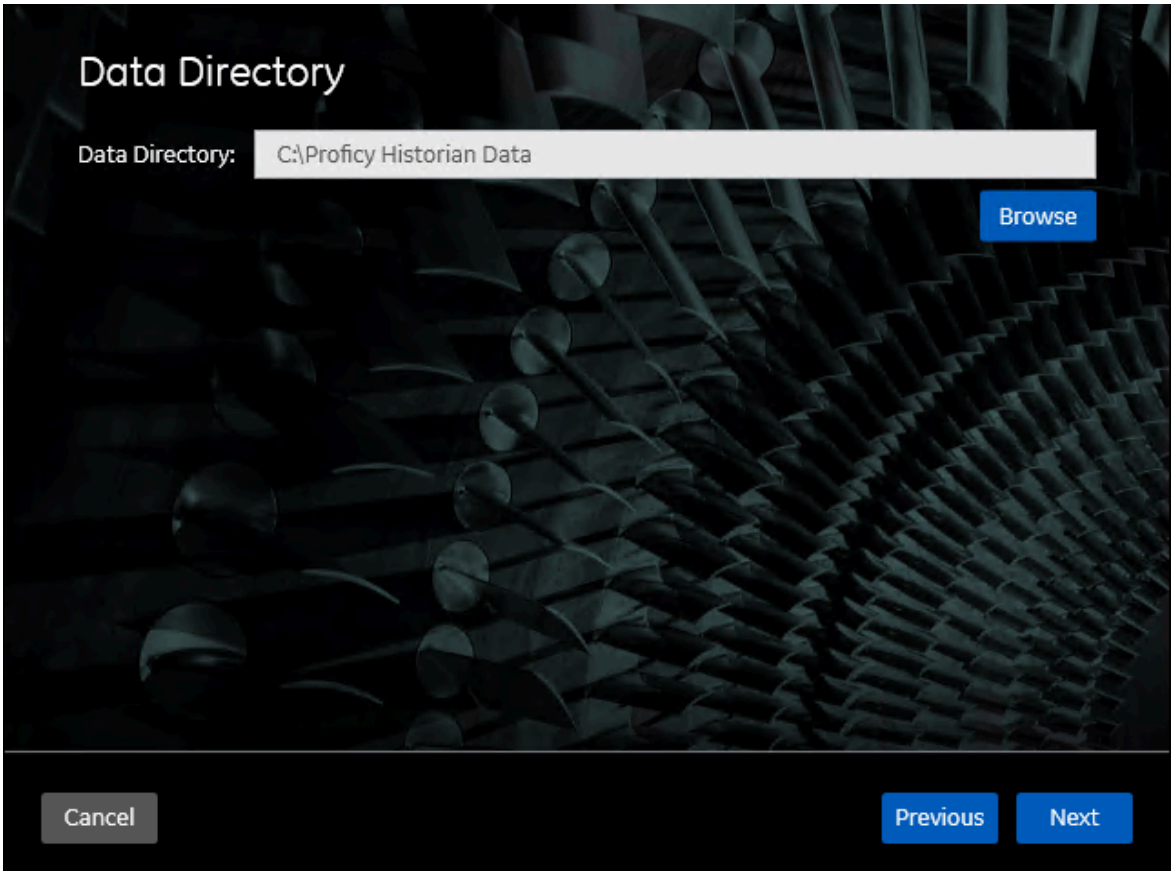
- **Executable files:** These files are required to add a collector instance.
- **Instances of the following collectors:**
  - The iFIX collector
  - The iFIX Alarms & Events collector
  - The OPC Classic Data Access collector for CIMPLICITY
  - The OPC Classic Alarms and Events collector for CIMPLICITY

  These instances will be created only if iFIX and/or CIMPLICITY are installed on the same machine as the collectors.
- **The Remote Collector Management agent:** Provides the ability to manage collectors remotely.

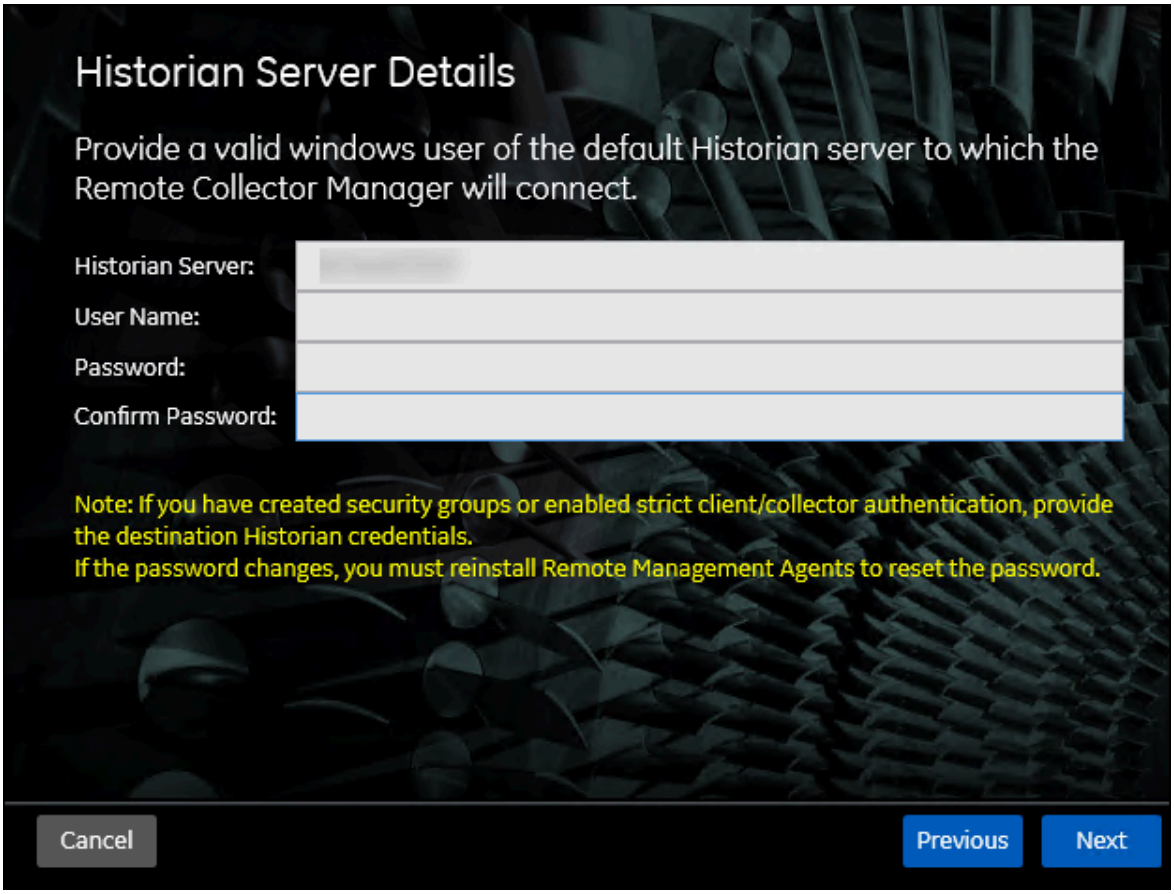
1. Run the `InstallLauncher.exe` file.
2. Select **Install Collectors**.
   The welcome page appears.
3. Select **Next**.
   The license agreement appears.
4. Select the **Accept** check box, and then select **Next**.
   The default installation drive appears.



5. If needed, modify the installation drive, and then select **Next**.
   The data directory page appears.



6. If needed, change the folder for storing the collector log files, and then select **Next**.
   The destination Historian server page appears.



7. Provide the credentials of the Windows user account of the destination Historian server to which you want Remote Management Agent to connect.

   These details are required for Remote Collector Manager to connect to Historian to manage the collectors remotely. If you are installing collectors on same machine as the Historian server, and if strict collector authentication is disabled, you need not provide these details; by default, the machine name of the local Historian server is considered. If, however, they are installed on different machines, or if strict collector authentication is enabled, you must provide the credentials of the Historian server user.

8. Select **Next**.
   The **You are ready to install** page appears.
9. Select **Install**.
   The installation begins.
10. When you are prompted to reboot your system, select **Yes**.

The collector executable files are installed in the following folder: `<installation drive>:\Program Files (x86)\GE Digital\<collector name>`. The iFIX collectors are installed in the following folder: `C:\Program Files\GE\iFIX`. The following registry paths are created:

- `HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node\ GE Digital\iHistorian\Services\<collector type>`
- `HKEY_LOCAL_MACHINE\SOFTWARE\GE Digital\iHistorian\Services\<collector type>`

In addition, if iFIX and/or CIMPLICITY are installed on the same machine as the collectors, instances of the following collectors are created:

- The iFIX collector
- The iFIX Alarms & Events collector
- The OPC Classic Data Access collector for CIMPLICITY
- The OPC Classic Alarms and Events collector for CIMPLICITY

Perform Post-Installation Tasks

1. If you do not want strict authentication, disable the **Enforce Strict Client Authentication** and **Enforce Strict Collector Authentication** options under Historian Administrator > **Data Stores** > **Security**.
2. While installing the Historian server, if you have allowed the installer to create Historian security groups, create a local Windows user with the format <Web-based Clients server name>.admin, and add the user to the ihSecurity Admins group. This user will log in to Web-based Clients. Alternatively, you can create Proficy Authentication users in an external Proficy Authentication and map their security groups. For information, refer to About Proficy Authentication Groups.

   Depending on whether the Historian server will use local or domain security groups, select the appropriate option in Historian Administrator.
3. Ensure that the Windows user that you have specified while installing collectors is added to the iH Security Admins and iH Collector Admins groups.
4. Enable trust for a client certificate for Configuration Hub.
5. Enable trust for a self-signed certificate on Chrome.
6. Import an issuer certificate.

You are now ready to use Configuration Hub.

Access Configuration Hub *(on page 1055)*.

Upgrade Configuration Hub

If you install Web-based Clients before uninstalling the previous version, you cannot modify the Configuration Hub credentials. If an earlier version of Configuration Hub is available on the same machine, you will be allowed to use the same; you cannot install Configuration Hub again.

1. Uninstall Configuration Hub.
2. Set up Configuration Hub *(on page 1023)*.

Access Configuration Hub

Perform the tasks outlined in About Setting up Configuration Hub *(on page 1023)*.

1. Double-click the Configuration Hub icon on your desktop ().
   The Configuration Hub login page appears.
2. Depending on whether you want to use Proficy Authentication or custom authentication, select the appropriate tab. If custom authentication is not applicable, skip this step.

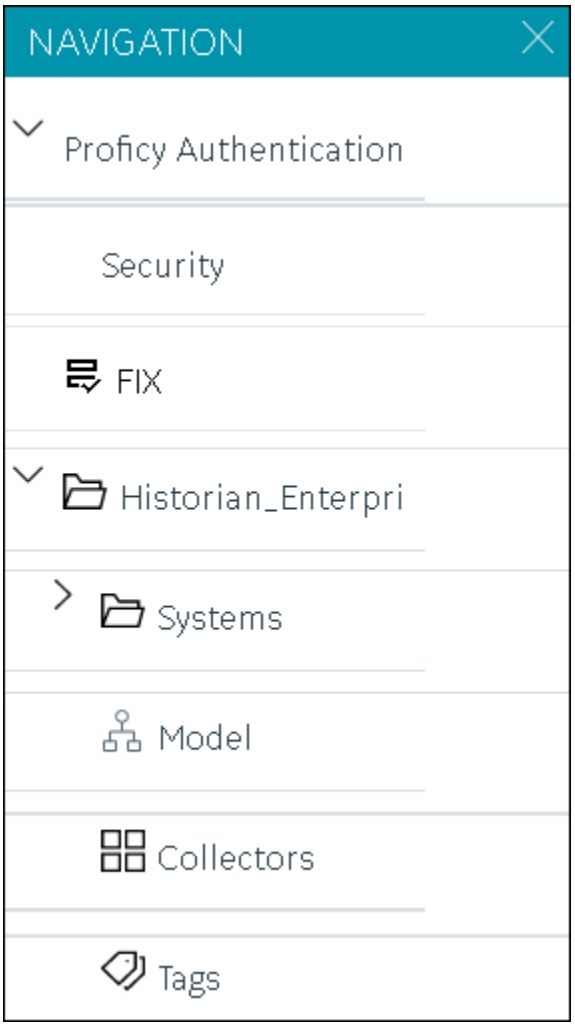
   Note:
   For instructions on setting up authentication, refer to https://www.ge.com/digital/documentation/confighub/version2024/t_authentication_setup.html

3. Select the Configuration Hub node that you want to access, and then select **Continue to Login**.
   The Proficy Authentication login page appears.
   If you cannot access the login page, start the GE Operations Hub Httpd Reverse Proxy and the Data Archiver services.
4. Log in with your credentials.

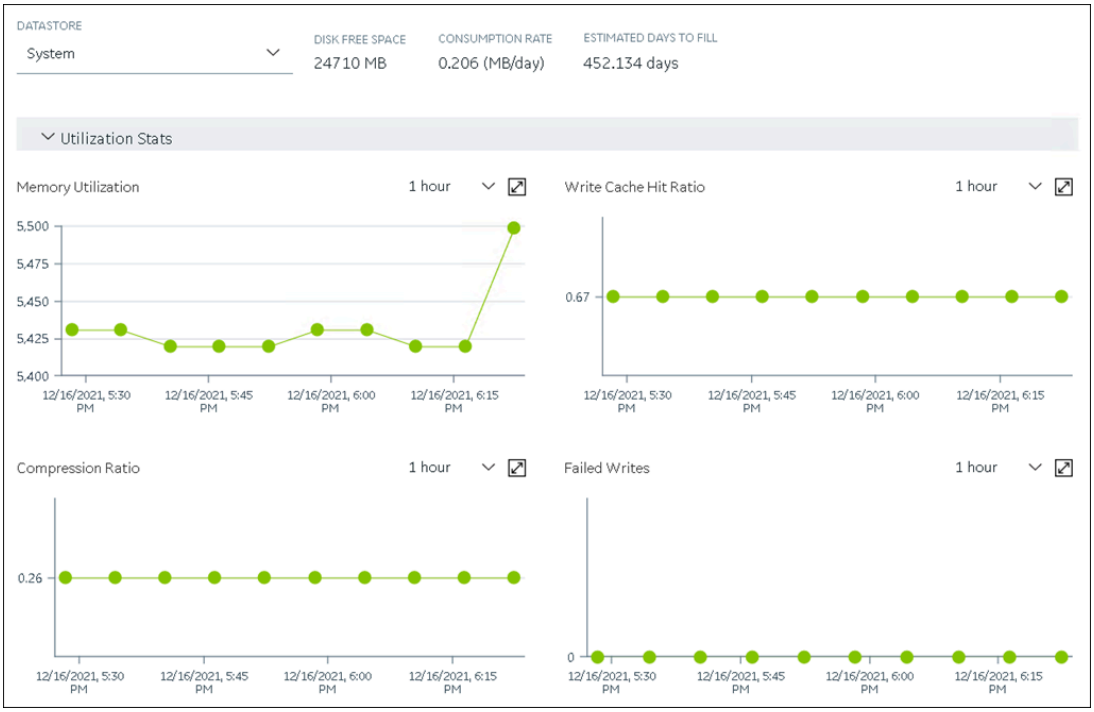
   Note:
   By default, the username is <*host name*>.admin, and the password is the value that you have entered in the **Admin client secret** field on the **Proficy Authentication Service** page during Web-based Clients installation.

   The Configuration Hub application appears, displaying the following sections:

- **The Navigation section:** Contains a list of systems that you have added. In addition, it helps you navigate to the Model, Collectors, and Tags sections. You can also access Proficy Authentication to create users and groups.

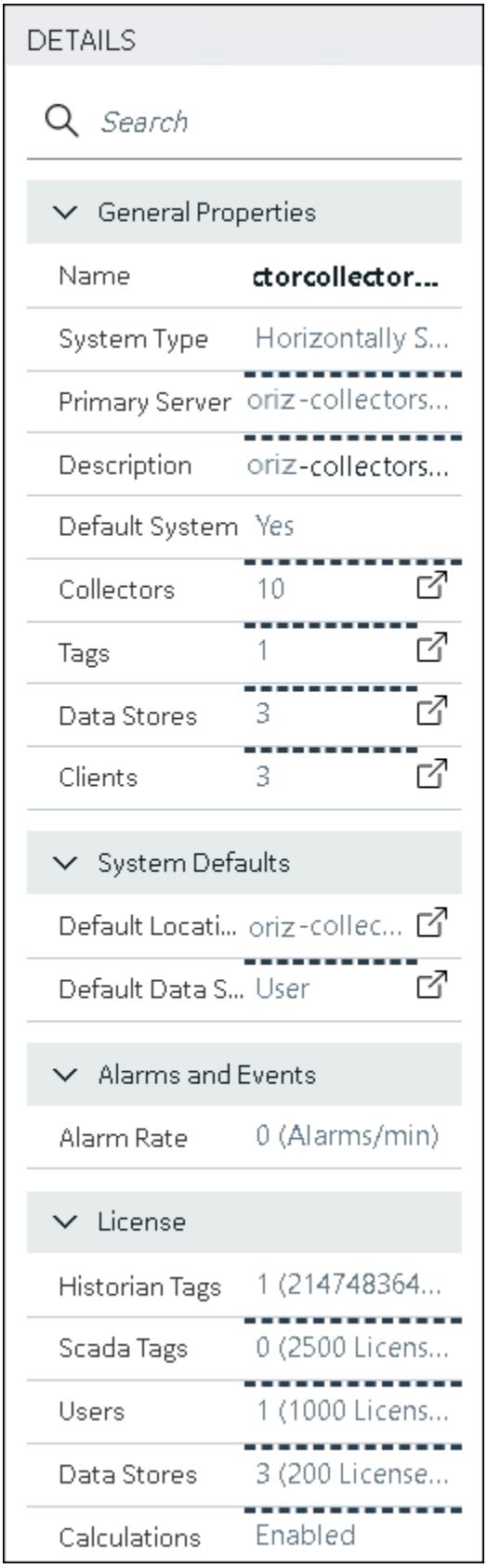


- **The main section:** Displays content based on your selection in the **NAVIGATION** section. For example,if you select a Historian system, you can access a list of servers in the system. You can also navigate to the system statistics as shown in the following image.



Similarly, if you select **Model** in the **NAVIGATION** section, you can access the Historian model.

- **The Details section:** Contains the details of the item selected in the main section. For example, If you select a system, you can view the description of the system, and add data stores and mirror locations using the **Details** section.


DETAILS
Search
General Properties
Name
ctorcollector...
System Type
Horizontally S...
Primary Server
oriz-collectors...
Description
oriz-collectors...
Default System
Yes
Collectors
10
Tags
1
Data Stores
3
Clients
3
System Defaults
Default Locati...
oriz-collec...
Default Data S...
User
Alarms and Events
Alarm Rate
0 (Alarms/min)
License
Historian Tags
1 (214748364...
Scada Tags
0 (2500 Licens...
Users
1 (1000 Licens...
Data Stores
3 (200 License...
Calculations
Enabled

Depending on your requirements, set up a stand-alone system or a horizontally scalable system.

Historian Plugin Management in Configuration Hub

About Historian Plugin Management in Configuration Hub

The Historian plugin in Configuration Hub enables you to perform several tasks like monitor, supervise, retrieve, and control gathering functions from a server, client, or one or more remote nodes. However, it operates as a web-based application.

When you install the Historian server and web-based clients, the Configuration Hub application is installed along with Proficy Authentication. Additionally, the Historian node and plugin are automatically registered with the Proficy Authentication and Configuration Hub based on the Historian HTTP and database port numbers.

After installing the Historian Server and the Web-based clients, if you access the Configuration Hub, you can see the Historian plugin displayed in the **NAVIGATION** pane. Also, the Historian node and the plugin can be seen in the **Administration** plugin > **Node Manager**.

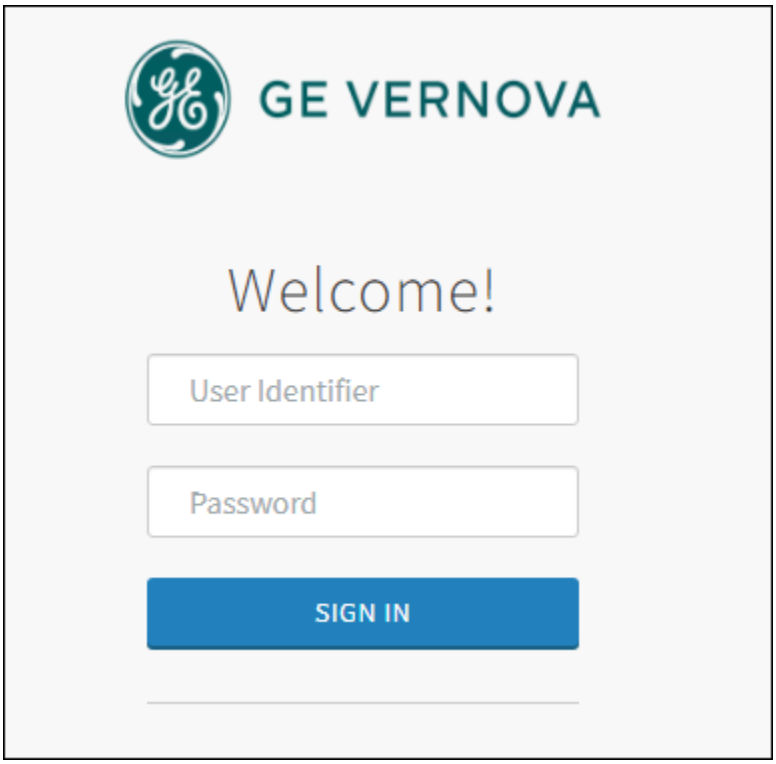
Note:
However, if during installation, the Historian node did not properly register with the Proficy Authentication and Configuration Hub, and did not appear in the Node Manager, you can add a Historian node *(on page 1063)* on Configuration Hub using the Node Manager.

The Node Manger consolidates control over product and license details, and you can view the corresponding Historian node's certificate, and license details. Using the Node Manager, if needed, you can modify a plugin display name *(on page 1066)*, unregister a plugin *(on page 1069)*, and if you want to register it at a later stage, you can register the plugin *(on page 1067)* again.

View Historian Node Details

Using the Historian node, you can view the Historian node-specific certificate and license details, and also plugin-specific details.

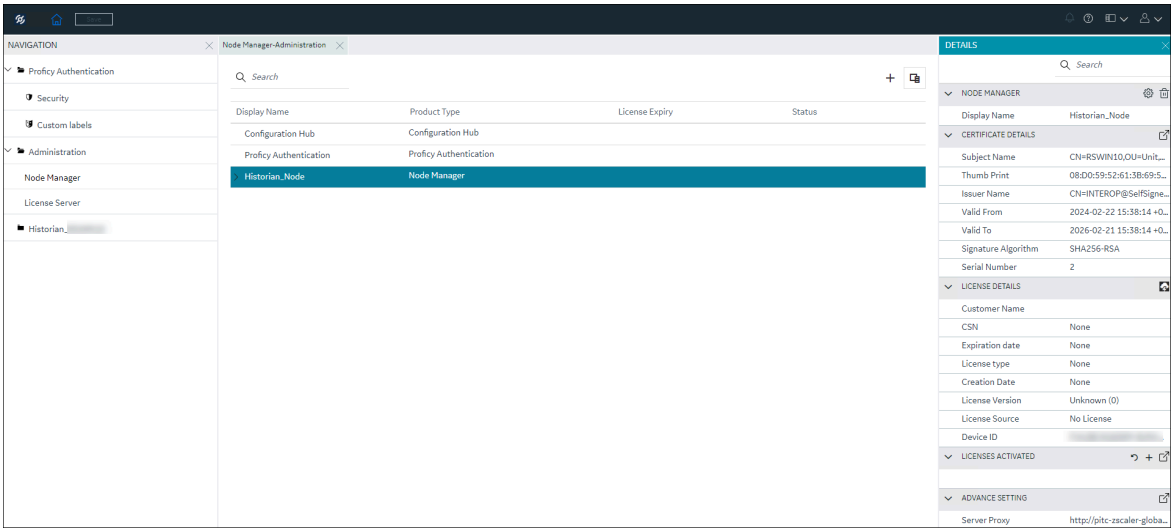
1. Double-click the Configuration Hub icon on your desktop ( ).
   The Configuration Hub login page appears.



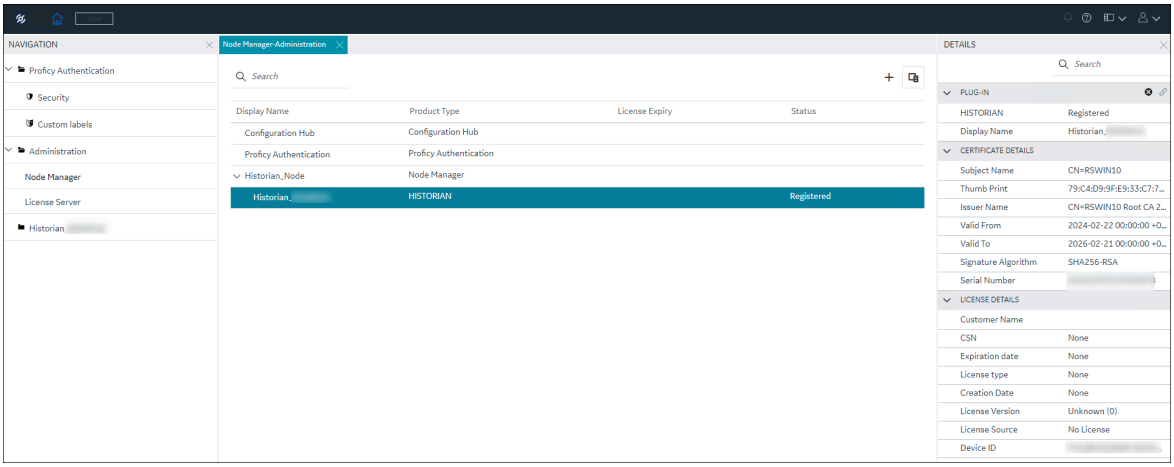
2. Login with the default user credentials. That is, <hostname>.admin.

The Configuration Hub application appears, listing the Historian plugin in the **NAVIGATION** pane.

3. In the **NAVIGATION** pane, select and expand **Administration**, and then select **Node Manager**. The Node Manager administration page appears, listing the available Historian node and the plugin.
4. To view the Historian node-specific license details, select the node. The node-specific details appear in the right-side section. Also, the license details are displayed in the **License Expiry** and **Status** columns.



5. To view the plugin-specific details, expand the node and select the plugin. The plugin-specific details appear in the right-side section.

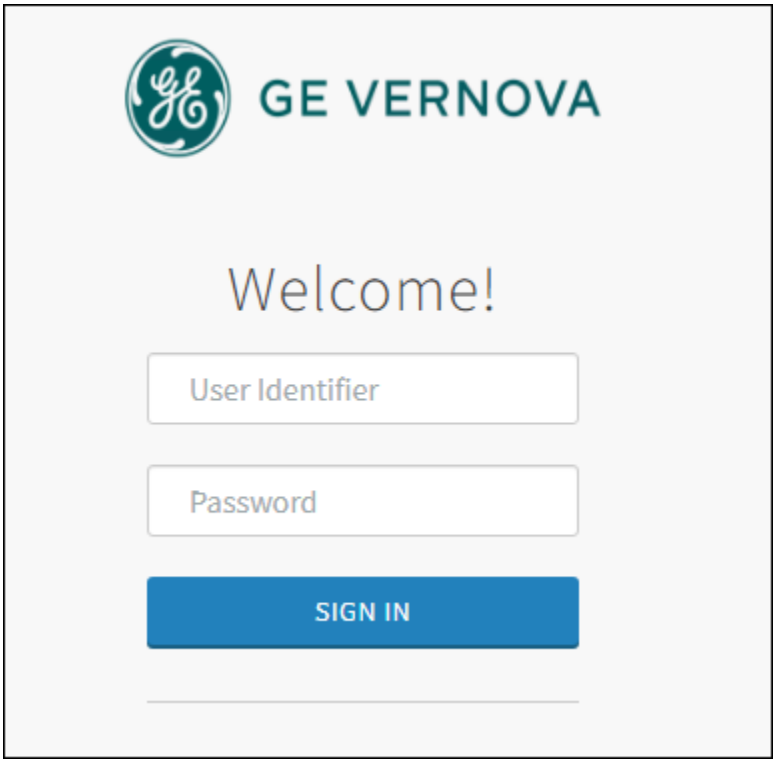


If you have the needed permission, you can perform additional certificate and node management tasks. For more information, refer to **Administration Plugin** in the Configuration Hub help.

Add a Historian Node (Optional)

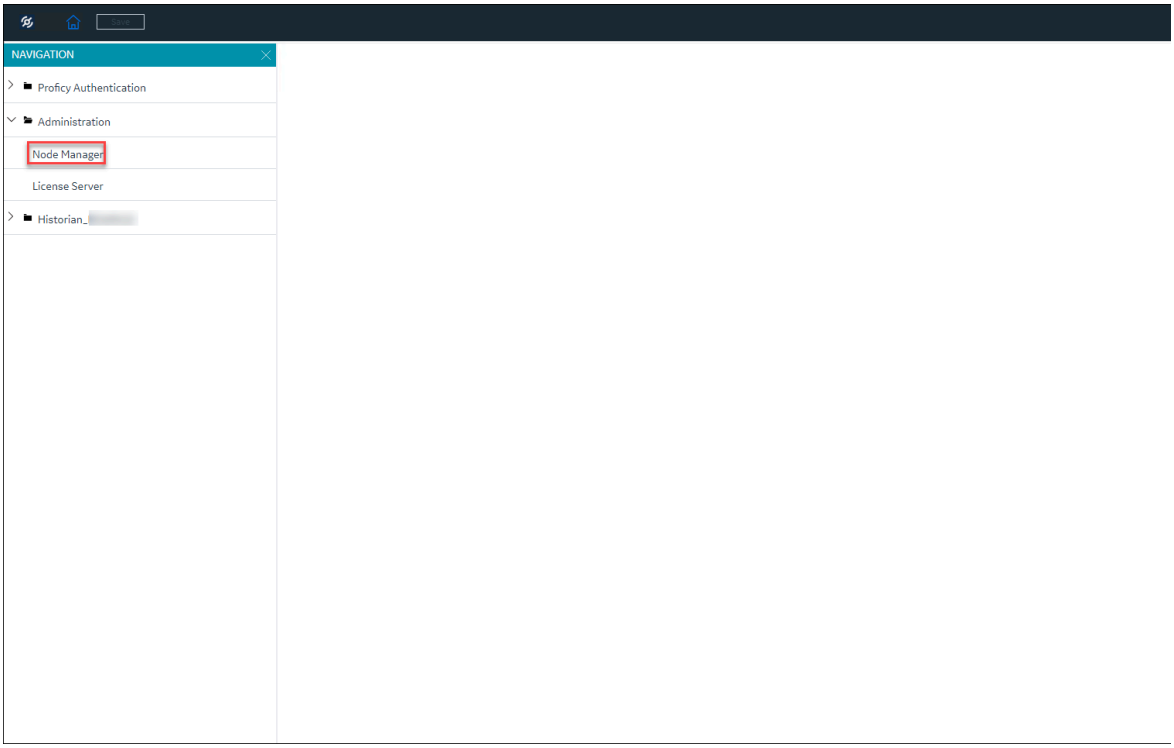
The steps listed in this topic are only needed if the Historian node was not properly configured during the installation and is not being displayed in the Node Manager.

1. Double-click the Configuration Hub icon on your desktop ( ).
   The Configuration Hub login page appears.

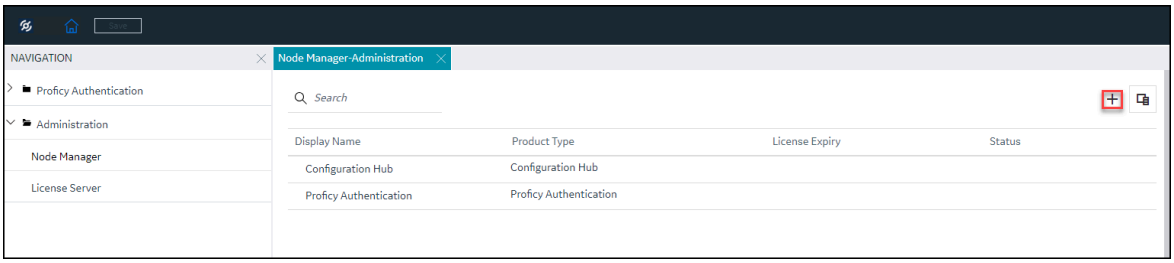


2. Login with the default user credentials. That is <hostname>.admin.
   The configuration hub application appears, listing the Historian plugin in the **NAVIGATION** pane.

3. In the **NAVIGATION** pane, select and expand **Administration**, and then select **Node Manager**.

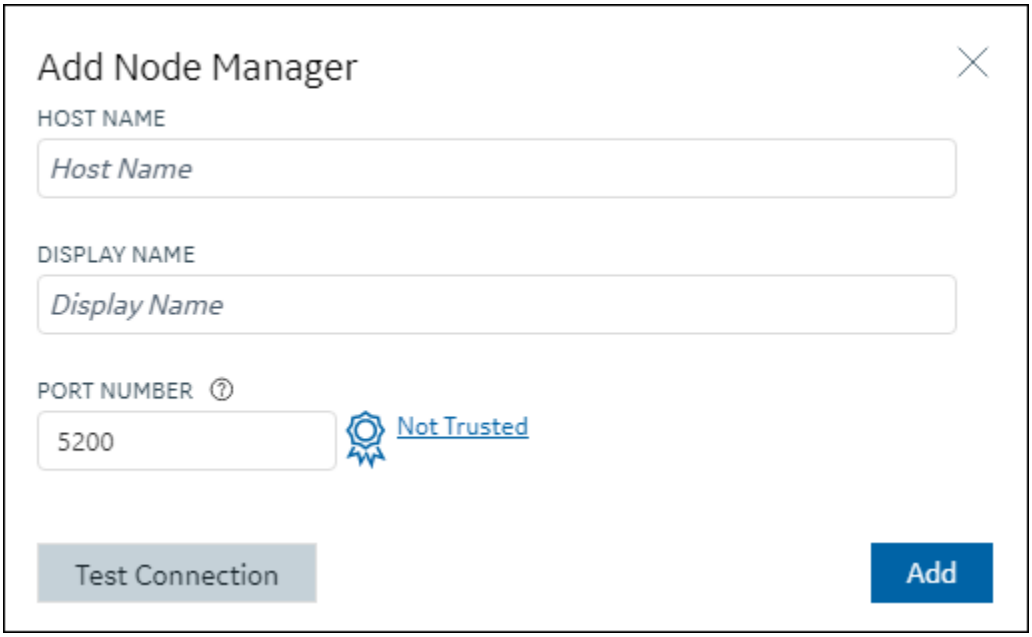


The node manager administration page appears.



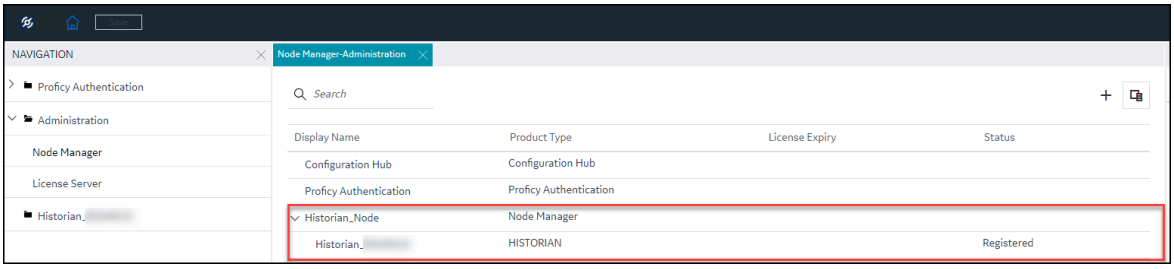
4. In the upper-right corner, select + .

   The **Add Node Manager** window appears.



5. Enter the **HOST NAME**. Here, it is the Historian node host name in a fully qualified domain name format. For example, testmachine123.testdomain.com.
6. Enter the **DISPLAY NAME** for the Historian node.
7. Enter the **PORT NUMBER** of the host that you entered.
8. You must trust the node manager certificate. To trust the certificate, select **Not Trusted**.
   The **Certificate Details** window appears, listing the certificate information.
9. Read the certificate details and if you trust, select **Trust**.
   In the **Add Node Manager** window, the certificate status changes to trusted.
10. Select **Test Connection**.
    If the connection is successful, a success message appears. If not, check the host name and the port are correct.
11. Select **Add**.
    The Historian node along with the plugin are added.

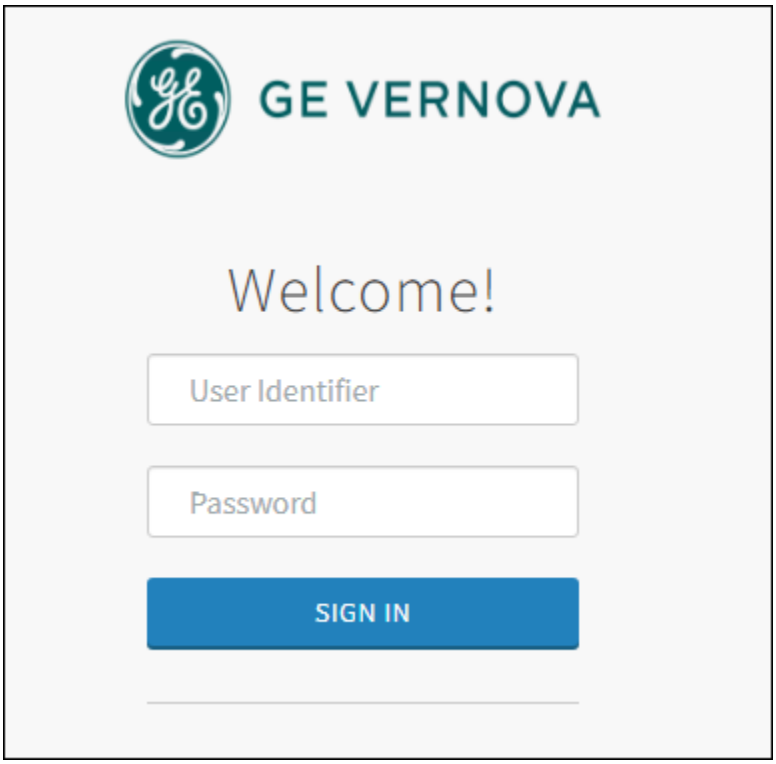
    By default, the plugin gets registered.



In rare cases, for some reason, if the plugin is not registered, you can register the plugin *(on page 1067)*.

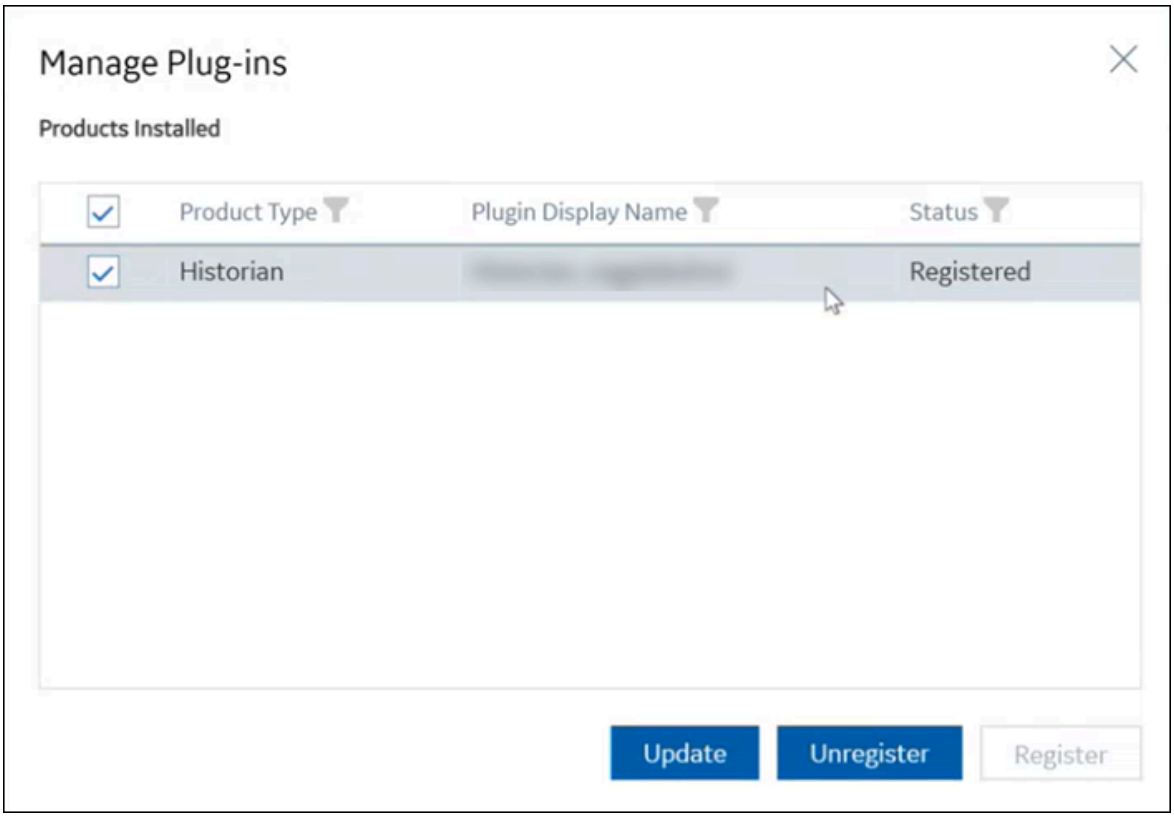
Modify a Historian Plugin Display Name

1. Double-click the Configuration Hub icon on your desktop ( ).
   The Configuration Hub login page appears.



2. Login with the default user credentials. That is <hostname>.admin.
   The configuration hub application appears, listing the Historian plugin in the **NAVIGATION** section.
3. In the **NAVIGATION** pane, select and expand **Administration**, and then select **Node Manager**.
   The Node Manager administration page appears, listing the available Historian node and the plugin.
4. Select and right-click the node, and then select **Manage**.

The **Manage Plug-ins** window appears.

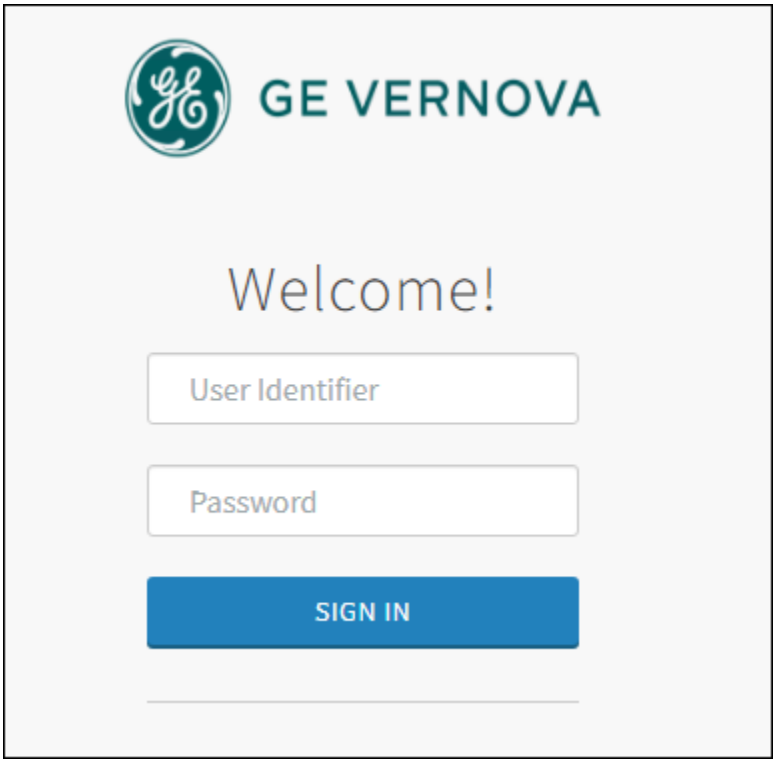


5. Change the plugin display name and select **Update**.
   The changes you made are updated and applied to the plugin.

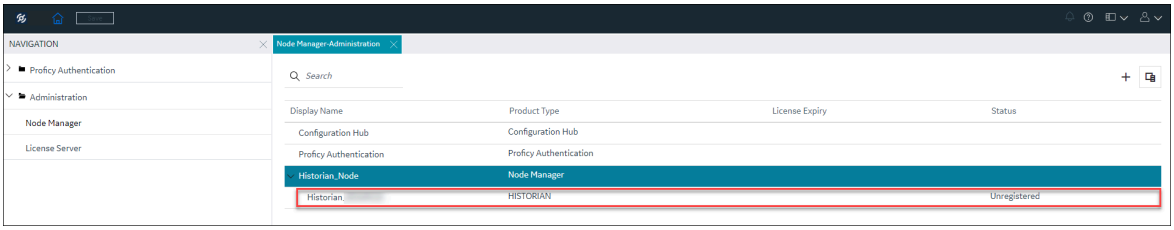
Register a Historian Plugin

If you had unregistered a plugin and want to register it again, or if, for some reason, the plugin was not registered after installation, you can register the plugin using the Node Manager, provided that you have the Historian node in the Node Manager. If the Historian node did not register properly, you must first add a Historian node *(on page 1063)* and then register the Historian node and its plugin.

1. Double-click the Configuration Hub icon on your desktop ( ).
   The Configuration Hub login page appears.



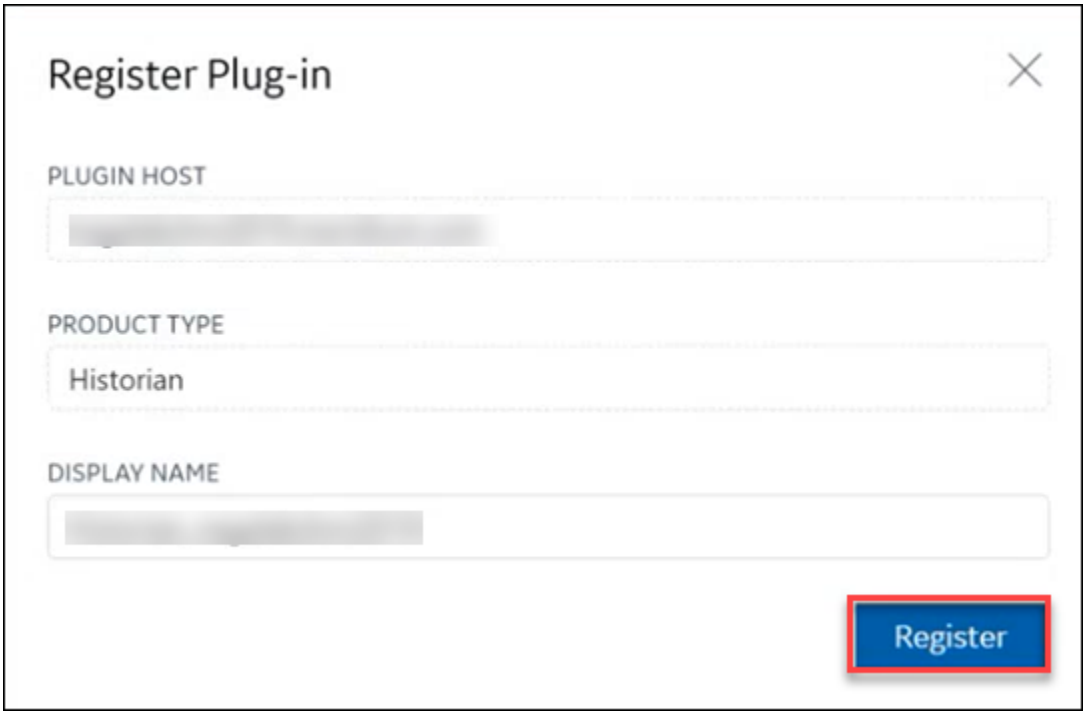
2. Login with the default user credentials. That is <hostname>.admin.
   The configuration hub application appears, listing the Historian plugin in the **NAVIGATION** section.
3. In the **NAVIGATION** pane, select and expand **Administration**, and then select **Node Manager**.
   The Node Manager administration page appears, listing the available Historian node and the plugin.



4. Select and right-click the plugin, and then select **Register**.
   Alternatively, you can select and right-click the node, and then select **Manage**.

   You can register the plugin using the **Register** button available in the **Manage Plug-ins** window.

   The **Register Plug-in** window appears.



5. Enter the values as described in the following table:

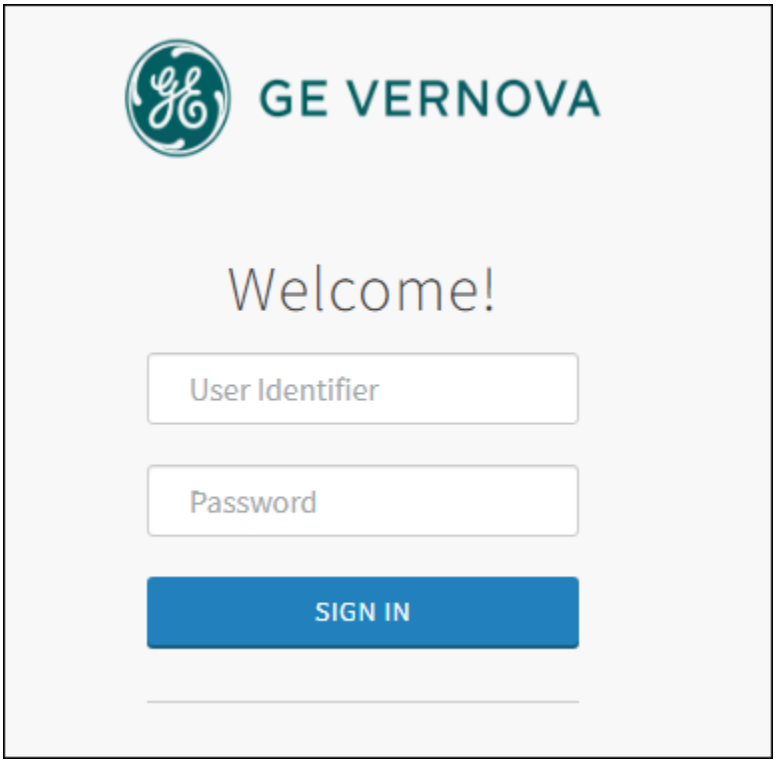
Field	Description
PLUGIN HOST	The host name of the plugin in a fully qualified domain name format.
PRODUCT TYPE	The product type for the plugin. For example, Historian.
DISPLAY NAME	The plugin name that you want to see below the Node Manager.

6. Select **Register**.
   The plugin gets registered and added in the **NAVIGATION** pane.
7. For the plugin to work, you must refresh the browser or log out and log in again to restart Configuration Hub.
8. Now try accessing the plugin.

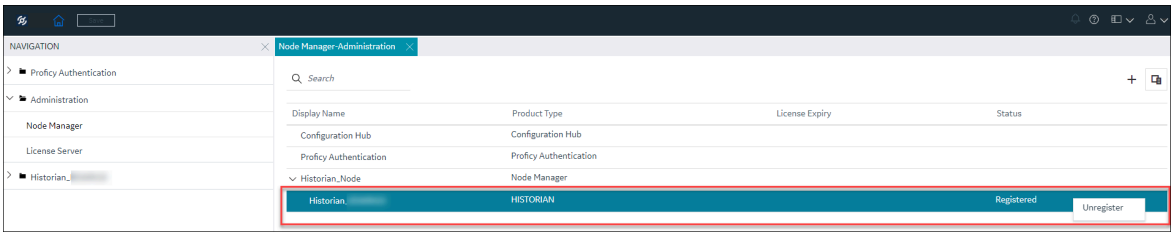
Unregister a Historian Plugin

If you need to unregister a plugin, you can do that using the Node Manager.

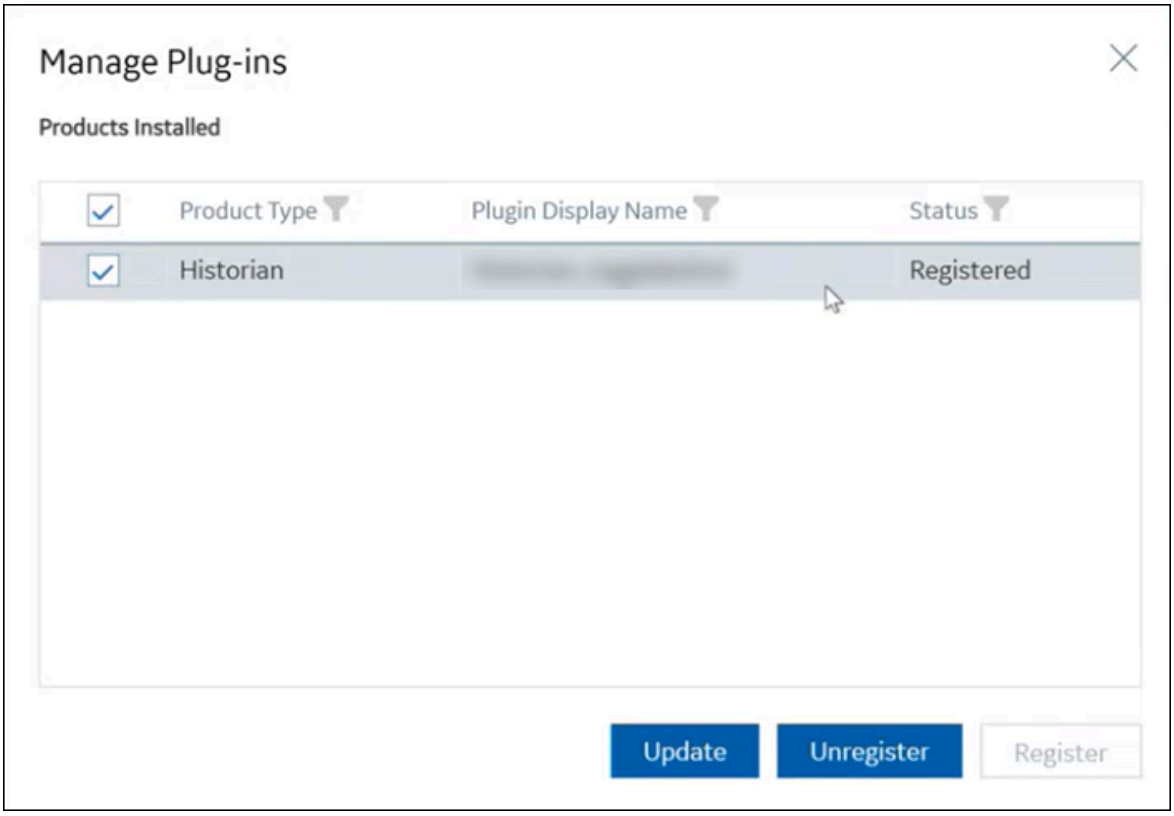
1. Double-click the Configuration Hub icon on your desktop ( ).
   The Configuration Hub login page appears.



2. Login with the default user credentials. That is <hostname>.admin.
   The configuration hub application appears, listing the Historian plugin in the **NAVIGATION** pane.
3. In the **NAVIGATION** pane, select and expand **Administration**, and then select **Node Manager**.
   The node manager administration page appears.



4. Select and right-click the plugin, and then select **Unregister**.
   Alternatively, you can select and right-click the node, and then select **Manage**.
   The **Mange Plug-ins** window appears, listing all the available plugins.

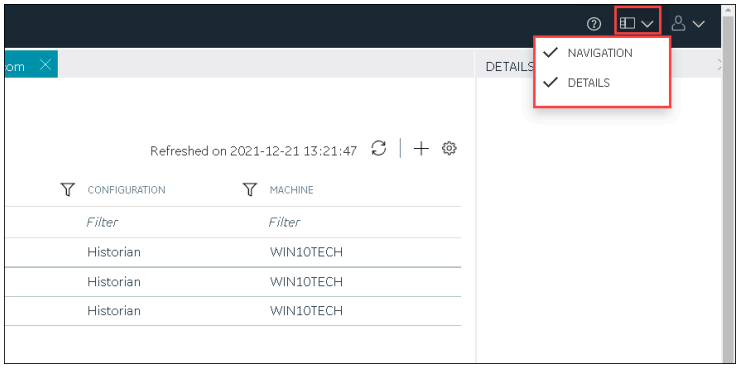
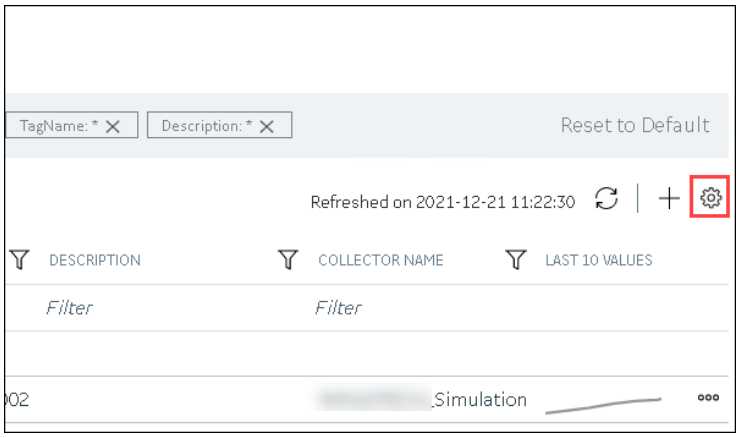


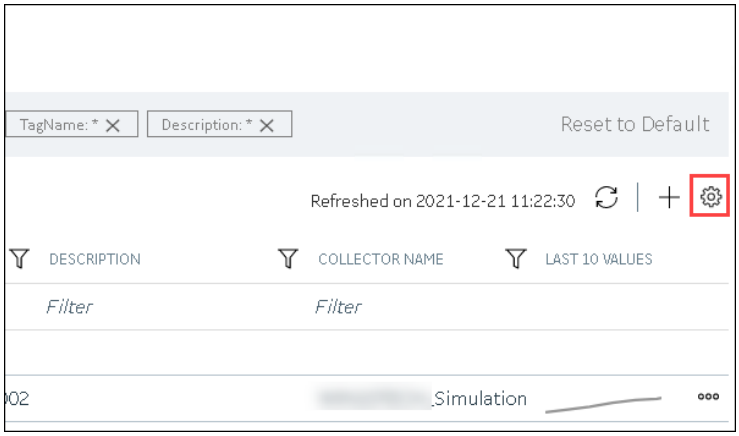
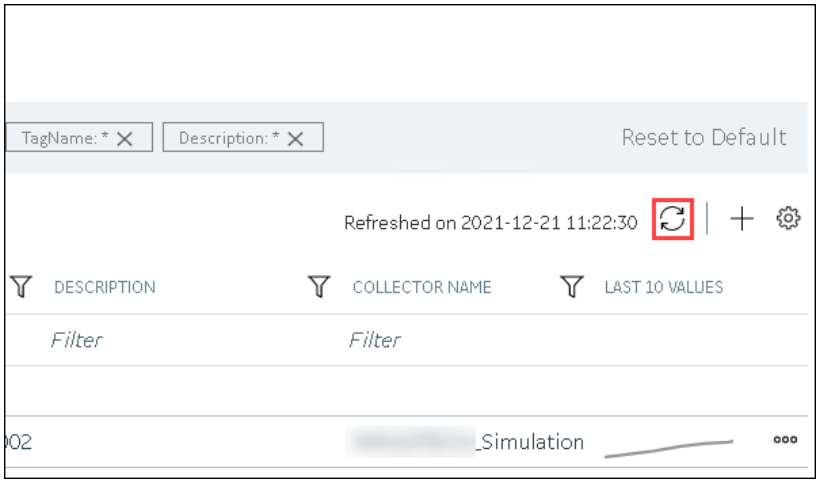
5. Select the plugin as needed.
6. Select **Unregister**.
   The plugin gets unregistered.

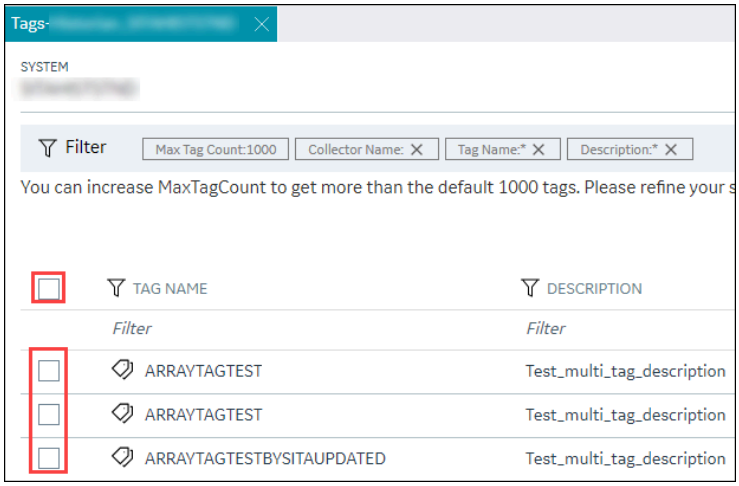
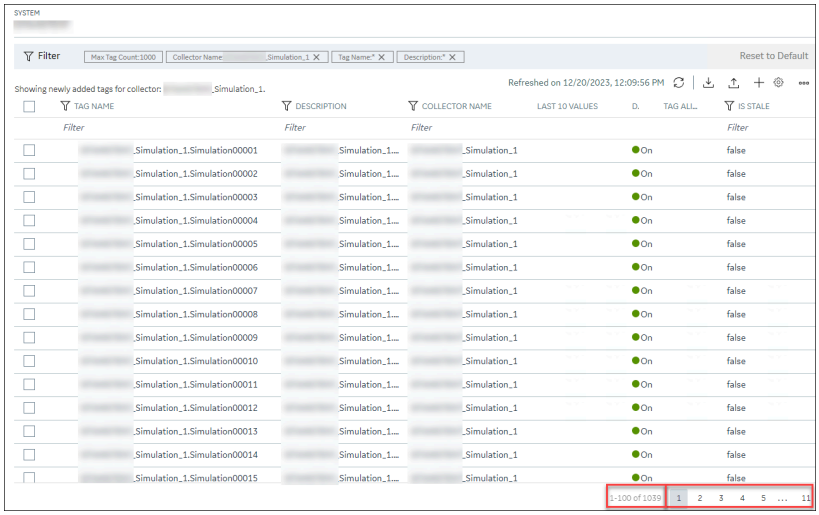
   Alternatively, you can also unregister a plugin from the Plugin **DETAILS** section by selecting **X** on the top-left corner in the **PLUG-IN** section.

   This will prompt you whether to delete the plugin. Selecting **Continue** will unregister the plugin.

Common Tasks in Configuration Hub

Task	Procedure
Show or hide the **Navigation** or the **Details** section.	1. In the upper-right corner of the page, select  . 2. Select the check boxes for the sections that you want to show. 
Show or hide columns in a table. **Note:** You cannot hide some of the columns (for example, the **COLLECTOR NAME** column).	1. In the upper-right corner of the table, select  .  The **Table Settings** window appears. 2. Select the check boxes in the **SHOW COLUMN** column, and then select **Apply**.

Task	Procedure
Reorder columns in a table. **Note:** You cannot reorder some of the columns.	1. In the upper-right corner of the table, select  .  The **Table Settings** window appears. 2. Use the arrow buttons in the **RE-ORDER** column, and then select **Apply**.
Refresh a page/table.	In the upper-right corner of the main section or a table, select  . 

Task	Procedure
Select multiple tags or clear the selection.	• To select multiple tags, select the check boxes corresponding to the tags as needed. Alternatively, to select all the available tags, select the check box in the upper-left corner of table header. 
Navigate through grids in a page	When there are more than 100 rows in a grid, page numbers are enabled at the bottom-right corner. You can use these page numbers to navigate through the grid and access other available rows.  In addition to this, you can also see a grid's count (both total and selected).

Setting up a Stand-Alone System

About Setting up a Stand-Alone Historian System

In a stand-alone Historian system, there is only one Historian server. This type of system is suitable for a small-scale Historian setup.

To set up a stand-alone Historian system, you must first set up Configuration Hub *(on page 1023)*.

Components of a Historian System: In a Historian system, the following components are used. This list is not comprehensive. For a complete list, refer to System Components *(on page)*.

- **The Historian server:** You must install a single-server Historian, and apply the license *(on page)*.
- **A Historian system:** A Historian system is a network of Historian servers that collect, store, and retrieve data related to tags, alarms, and events.

  By default, a system is created when you set up Configuration Hub.
- **A data store:** A data store is a logical collection of tags used to store, organize, and manage tags according to your requirements. The primary use of data stores is segregating tags by data collection intervals. For example, you can put name plate or static tags (where the value rarely changes) in one data store, and put process tags in another data store. This can improve the query performance.

  By default, a user data store is created when you set up Configuration Hub. You can add more as needed.
- **A collector instance:** Collectors are the applications that collect data from a data source, and send it to an on-premises Historian server or a cloud destination such as Predix Time Series and Azure IoT hub.

  You must add a collector instance *(on page 1076)* to begin collecting data. You can choose the type of the collector depending on your need. You can use any existing instances (created during collector installation or ported during an upgrade).
- **Tags:** Tags are the parameters for which you want to store data (for example, temperature, pressure, torque).

  You must specify the tags *(on page 1077)* for which you want to collect data.
- **Data archiver:** This is a service that indexes all the data by tag name and timestamp, and stores the result in an .iha file.

By default, this is installed when you install the Historian server.

- **Clients:** These are applications that retrieve data from the archive files using the Historian API.

  By default, these are installed when you set up Configuration Hub.

Add a Collector Instance

Before you begin using a collector, you must add an instance of the collector. You can add multiple instances of the same collector or instances of multiple collectors. To add multiple instances of a collector, perform the steps once again.

You can add and configure the following types of collector instances:

- The Calculation collector *(on page 1198)*
- The CygNet collector *(on page 1201)*
- The File collector *(on page 1205)*
- The HAB collector *(on page 1208)*
- The iFIX collector *(on page 1224)*
- The MQTT collector *(on page 1229)*
- The MQTT Sparkplug B collector *(on page 1238)*
- The ODBC collector *(on page 1246)*
- The OPC Classic Alarms and Events collector *(on page 1251)*
- The OPC Classic DA collector *(on page 1253)*
- The OPC Classic HDA collector *(on page 1259)*
- The OPC UA DA collector *(on page 1263)*
- The OSI PI collector *(on page 1268)*
- The OSI PI distributor *(on page 1272)*
- The Server-to-Server collector *(on page 1278)*
- The Server-to-Server distributor *(on page 1282)*
- The Simulation collector *(on page 1286)*
- The Windows Performance collector *(on page 1290)*
- The Wonderware collector *(on page 1294)*

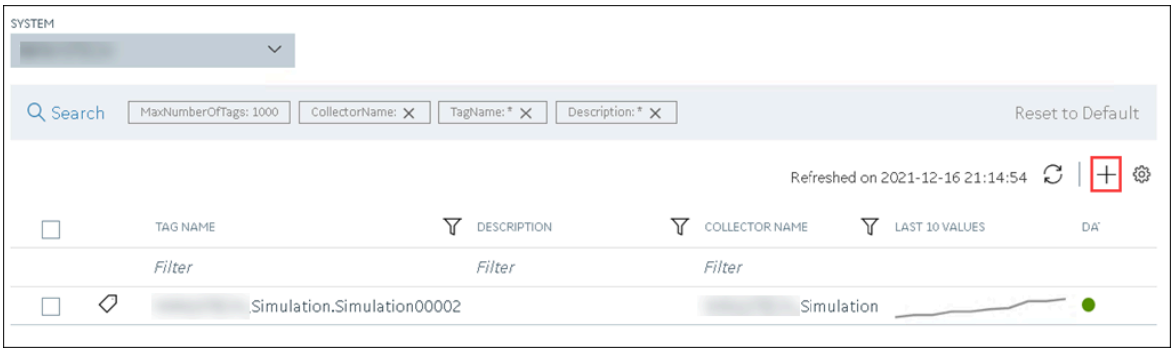
Add Tags for the Data Store Using Configuration Hub

- Add the collector instance *(on page 1076)* using which you want to collect data. Ensure that the collector is running.
- By default, the tag data is stored in the user data store, which is created automatically when you set up Configuration Hub. If, however, you want to store the data in a different data store, create it *(on page 1089)*.

This topic describes how to specify the tags for which you want to collect data by browsing through the tags in the data source. For example, for an iFIX collector, if there are 1,00,000 tags in the iFIX server, you must specify the ones for which you want to collect data. Only then data is collected for those tags.

In addition to adding tags from the data source, you can create tags manually *(on page 1192)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select +.



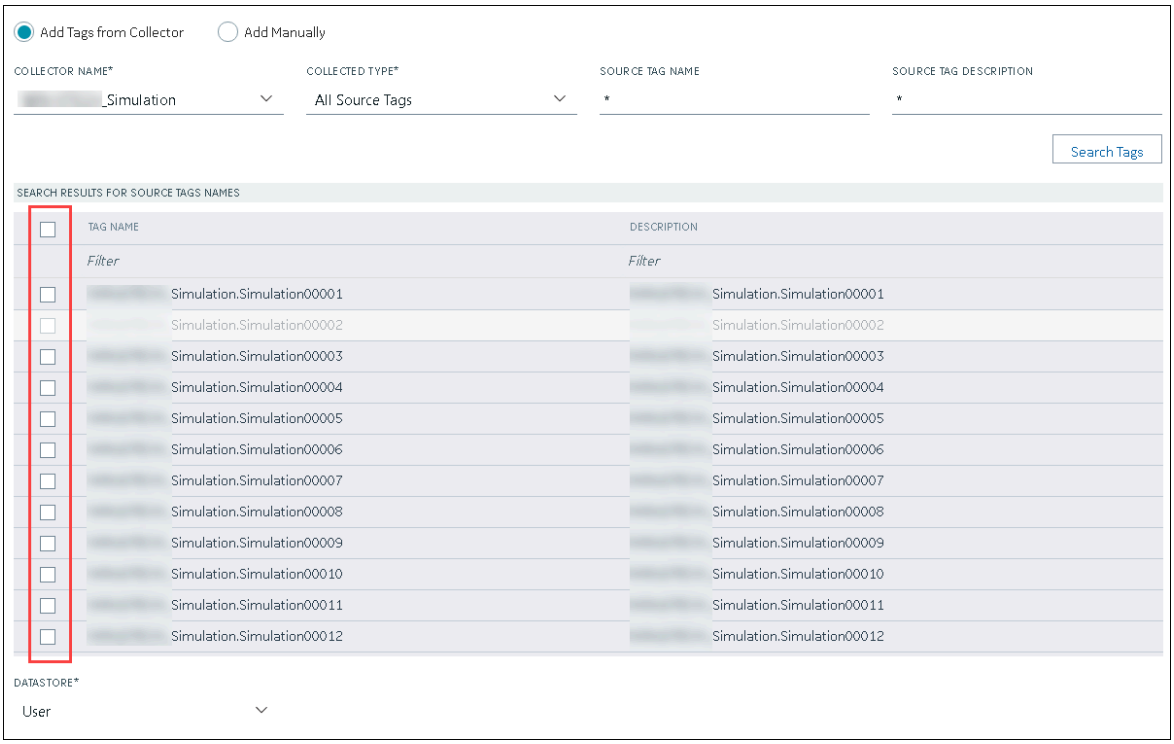
The **Add Tag-<system name>** page appears. The **Add Tags from Collector** option is selected by default.

4. Enter values as described in the following table.

Field	Description
COLLECTOR NAME	Select the collector instance that you want to use to collect data. A value is required.
COLLECTED TYPE	Specify whether you want to browse through all the tags in the data source or only from the tags that you have not added yet. A value is required.

Field	Description
SOURCE TAG NAME	Enter the name of the tag (either completely or partially) to narrow down the search results.
SOURCE TAG DESCRIPTION	Enter the description of the tag (either completely or partially) to narrow down the search results.

5. Select **Search Tags**.
   A list of tags that match *all* the criteria that you have specified appears. If a tag is already added, it is disabled.
6. Select the check box corresponding to each tag for which you want to collect data.



7. In the **DATA STORE** field, if you want to store the data in a different data store than the user data store, select the same.
8. Select **Add Tag**.
   Data collection begins for the selected tags.

As needed, configure each tag by providing values for the tag properties. For information on the delta query modes, refer to Counter Delta Queries.

Setting up a Horizontally Scalable System

About Setting up a Horizontally Scalable System

In a horizontally scalable Historian system, there are multiple Historian servers, all of which are connected to one another. This type of system is used to scale out the system horizontally. For example, if you have 5,00,000 tags in your Historian system, you can distribute them among the various servers to improve performance.

To set up a horizontally scalable system, you must first set up Configuration Hub *(on page 1023)*.

Components of a Historian System: In a Historian system, the following components are used. This list is not comprehensive. For a complete list, refer to System Components *(on page)*.

- **The Historian servers:** You must install the following types of Historian servers:
  - **Primary:** A primary server is the only server in a system where the Configuration Manager service runs. For the entire system, Configuration Manager manages the system configuration licensed by the user (that is, the number of tags, options, and so on). Each system can have only one primary server.

    You must apply the Enterprise license *(on page)* to the primary server.
  - **Distributed/Mirror:** These servers collect and store data. If added to a mirror group/location, you can achieve high availability *(on page 1086)*.

    You must apply the Distributed license *(on page)* to the distributed/mirror servers.
- **A Historian system:** A Historian system is a network of Historian servers that collect, store, and retrieve data related to tags, alarms, and events.

  By default, a system is created when you set up Configuration Hub.
- **Data stores:** A data store is a logical collection of tags used to store, organize, and manage tags according to your requirements. The primary use of data stores is segregating tags by data collection intervals. For example, you can put name plate or static tags (where the value rarely changes) in one data store, and put process tags in another data store. This can improve the query performance.

  By default, a user data store is created when you set up Configuration Hub. You can add more as needed.
- **Locations:** These are virtual entities in which data stores are created. They are used for storage. The following types of locations are used in a horizontally scalable system:

    - **Distributed location:** This location is created automatically when you install a Historian mirror primary server, or when you install a Historian distributed/mirror node and add it to the primary server. You cannot modify or delete this location, and you cannot create another one.
    - **Mirror location:** This location is used to replicate data collected in a data store. For more information, refer to About Data Mirroring *(on page 1086)*.
- **A collector instance:** Collectors are the applications that collect data from a data source, and send it to an on-premises Historian server or a cloud destination such as Predix Time Series and Azure IoT hub.

  You must add a collector instance *(on page 1076)* to begin collecting data. You can choose the type of the collector depending on your need. You can use any existing instances (created during collector installation or ported during an upgrade).
- **Tags:** Tags are the parameters for which you want to store data (for example, temperature, pressure, torque).

  You must specify the tags *(on page 1077)* for which you want to collect data.
- **Data archiver:** This is a service that indexes all the data by tag name and timestamp, and stores the result in an .iha file.

  By default, this is installed when you install the Historian server.
- **Clients:** These are applications that retrieve data from the archive files using the Historian API.

  By default, these are installed when you set up Configuration Hub.

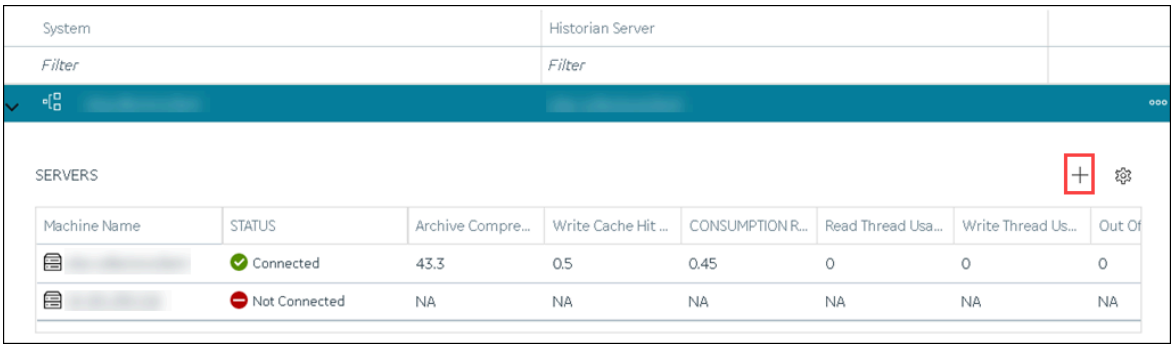
Add a Distributed/Mirror Server

1. Install Historian server *(on page 1024)* on the machine that you want to add as a distributed server.
2. Add a system *(on page 1146)*. The server that you specify while adding the system serves as the primary server for the system.

If you want to create a horizontally scalable Historian system, you must first add a primary server, and then add one or more distributed/mirror machines to scale out the primary server horizontally and thus, improve performance.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**. A list of systems appears in the main section.

3. Expand the system in which you want to add a distributed/mirror server.
   A list of servers in the system appears.
4. Select +.



   The **Add Server Machine: <system name>** window appears.
5. Enter the host name or IP address of the machine that you want to add, and then select **Add**.
   The distributed server is added to the system. A distributed location is added in the server. You cannot modify or delete this location.

- If you want high availability of one or more data stores in the server, create a mirror location *(on page 1087)*, and then add the data stores *(on page 1089)*. If not, add the data store *(on page 1089)* to the distributed location.
- If you want to set a distributed node as backup to the primary node, set a distributed node as backup *(on page 1084)*.

Add a Collector Instance

Before you begin using a collector, you must add an instance of the collector. You can add multiple instances of the same collector or instances of multiple collectors. To add multiple instances of a collector, perform the steps once again.

You can add and configure the following types of collector instances:

- The Calculation collector *(on page 1198)*
- The CygNet collector *(on page 1201)*
- The File collector *(on page 1205)*
- The HAB collector *(on page 1208)*
- The iFIX collector *(on page 1224)*
- The MQTT collector *(on page 1229)*
- The MQTT Sparkplug B collector *(on page 1238)*
- The ODBC collector *(on page 1246)*

- The OPC Classic Alarms and Events collector *(on page 1251)*
- The OPC Classic DA collector *(on page 1253)*
- The OPC Classic HDA collector *(on page 1259)*
- The OPC UA DA collector *(on page 1263)*
- The OSI PI collector *(on page 1268)*
- The OSI PI distributor *(on page 1272)*
- The Server-to-Server collector *(on page 1278)*
- The Server-to-Server distributor *(on page 1282)*
- The Simulation collector *(on page 1286)*
- The Windows Performance collector *(on page 1290)*
- The Wonderware collector *(on page 1294)*

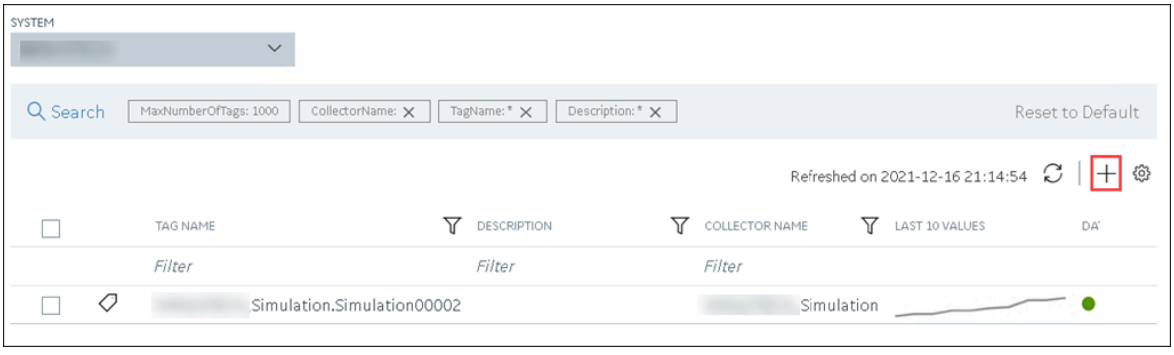
Add Tags for the Data Store Using Configuration Hub

- Add the collector instance *(on page 1076)* using which you want to collect data. Ensure that the collector is running.
- By default, the tag data is stored in the user data store, which is created automatically when you set up Configuration Hub. If, however, you want to store the data in a different data store, create it *(on page 1089)*.

This topic describes how to specify the tags for which you want to collect data by browsing through the tags in the data source. For example, for an iFIX collector, if there are 1,00,000 tags in the iFIX server, you must specify the ones for which you want to collect data. Only then data is collected for those tags.

In addition to adding tags from the data source, you can create tags manually *(on page 1192)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select +.

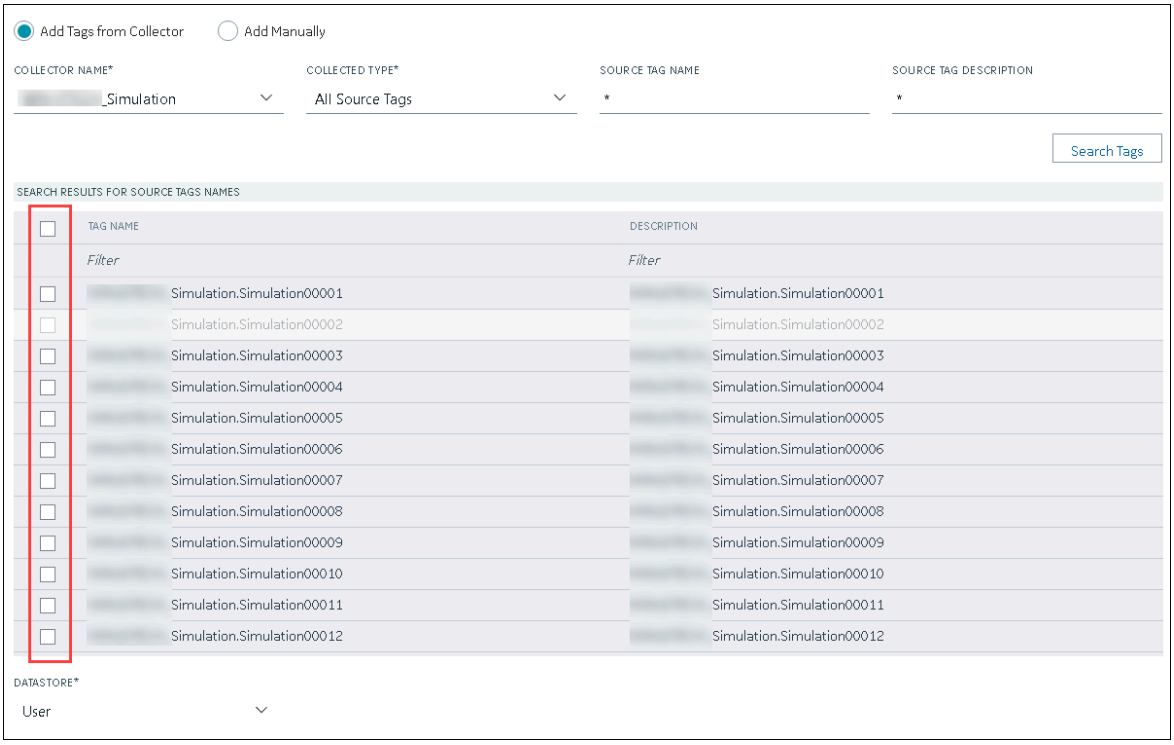


The **Add Tag-<system name>** page appears. The **Add Tags from Collector** option is selected by default.

4. Enter values as described in the following table.

Field	Description
COLLECTOR NAME	Select the collector instance that you want to use to collect data. A value is required.
COLLECTED TYPE	Specify whether you want to browse through all the tags in the data source or only from the tags that you have not added yet. A value is required.
SOURCE TAG NAME	Enter the name of the tag (either completely or partially) to narrow down the search results.
SOURCE TAG DESCRIPTION	Enter the description of the tag (either completely or partially) to narrow down the search results.

5. Select **Search Tags**.
   A list of tags that match *all* the criteria that you have specified appears. If a tag is already added, it is disabled.
6. Select the check box corresponding to each tag for which you want to collect data.



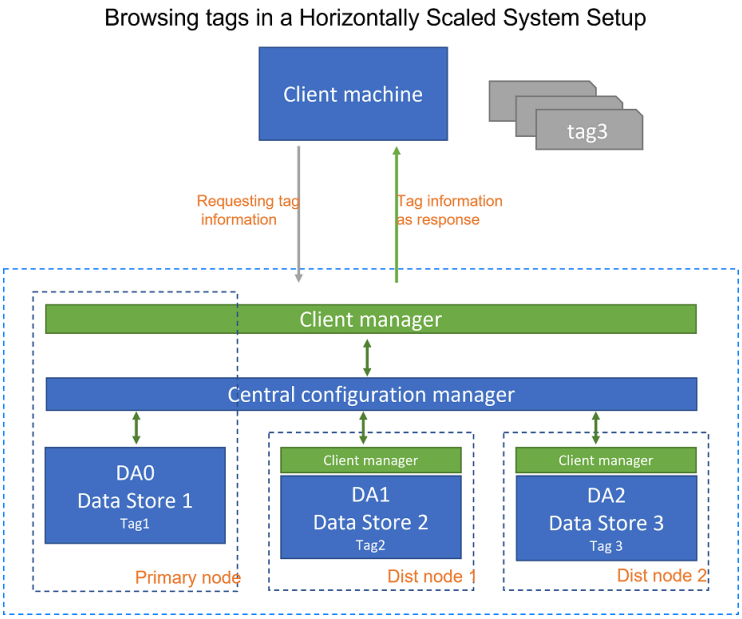
7. In the **DATA STORE** field, if you want to store the data in a different data store than the user data store, select the same.
8. Select **Add Tag**.
   Data collection begins for the selected tags.

As needed, configure each tag by providing values for the tag properties. For information on the delta query modes, refer to Counter Delta Queries.

Browse Tags using Distributed or Mirror Node Servers when Primary Server is Inactive

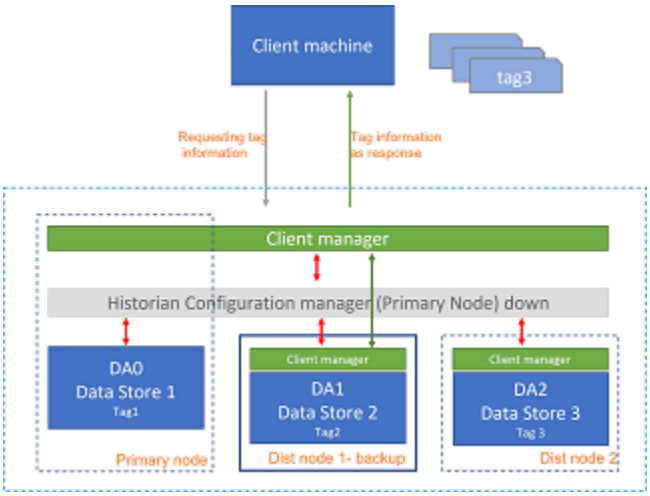
In a horizontally scaled system, there can be multiple Historian servers that are connected to one another. That is, if there are 100000 tags in your system, you can distribute them among the various servers. Similarly, you can view the tags and their values in all the servers.

For example, consider the following setup:



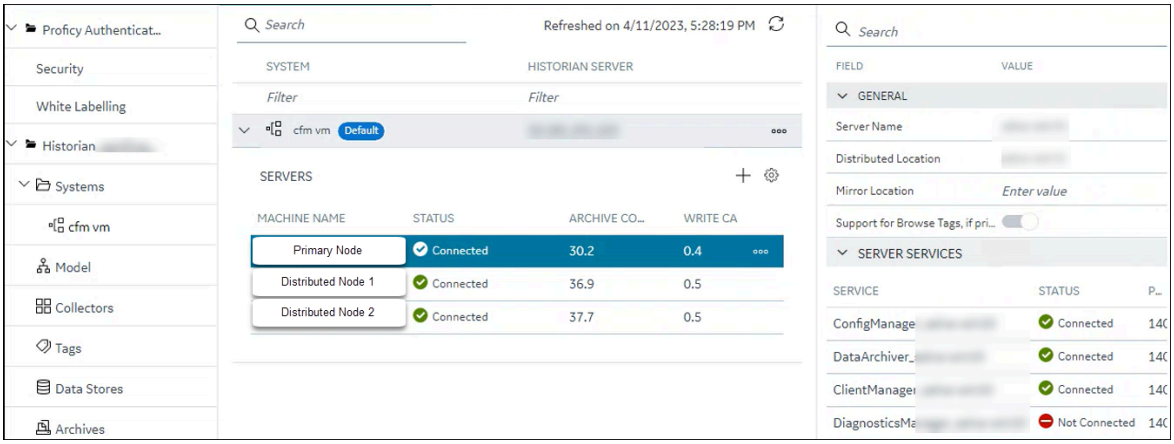
In general, the Historian configuration manager of the primary node stores the tag information of all the data stores in the system. Whenever a client machine requests tag information, the Historian configuration manager sends the corresponding information for all nodes (primary, distributed 1, and distributed 2) to the client machine through the client manager. Suppose the central configuration manager is inactive, in that case, the client manager of the primary node sends the tag information corresponding to the primary node (data store 1) to the client machine. Consequently, the tag information of the other nodes will not be sent to the client machine.

To overcome this, you can assign the other nodes as backups for the primary node's central configuration manager. Therefore, whenever the central configuration manager is inactive, the Data Archiver (DA) of the backup node functions as a configuration manager and sends all tag information to the client manager. The client manager will then forward the tag information response to the client machine. With this, you can still browse tags and their details when the primary node's configuration manager is inactive.

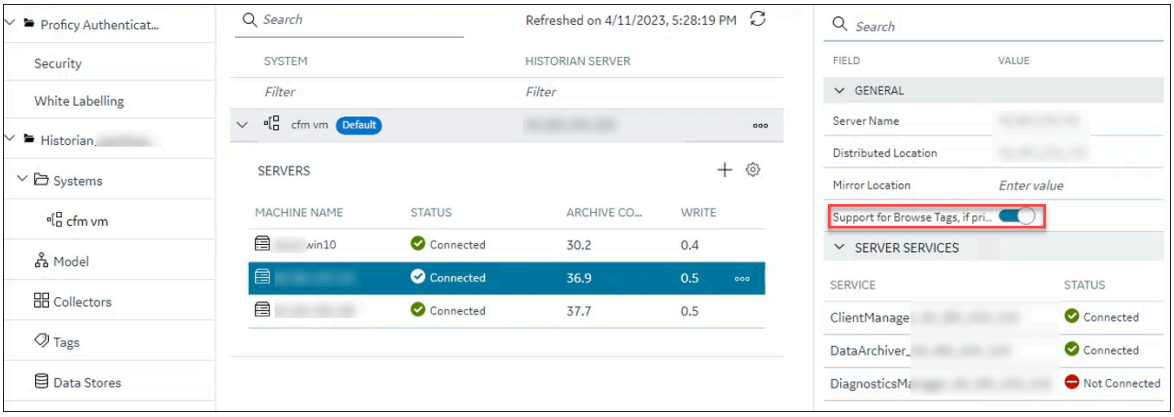


This topic describes how to set a distributed node as a backup node for the primary node.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system that you want to access.
   The selected system and its details appear.
3. Expand the system to see the corresponding servers.



4. Select a distributed node that you want to set as the backup.
   The selected distributed node's details appear in the **DETAILS** section.



5. In the **GENERAL** section, enable **Support for Browse Tags, if primary server down**.
6. In the upper-left corner, select **save**.
   The selected distributed node is set as a backup for the primary node's configuration manager.

If your primary node's configuration manager is inactive, you can still browse the tags and their details corresponding to all the nodes within the horizontally scaled system.

Setting up High Availability

About Data Mirroring

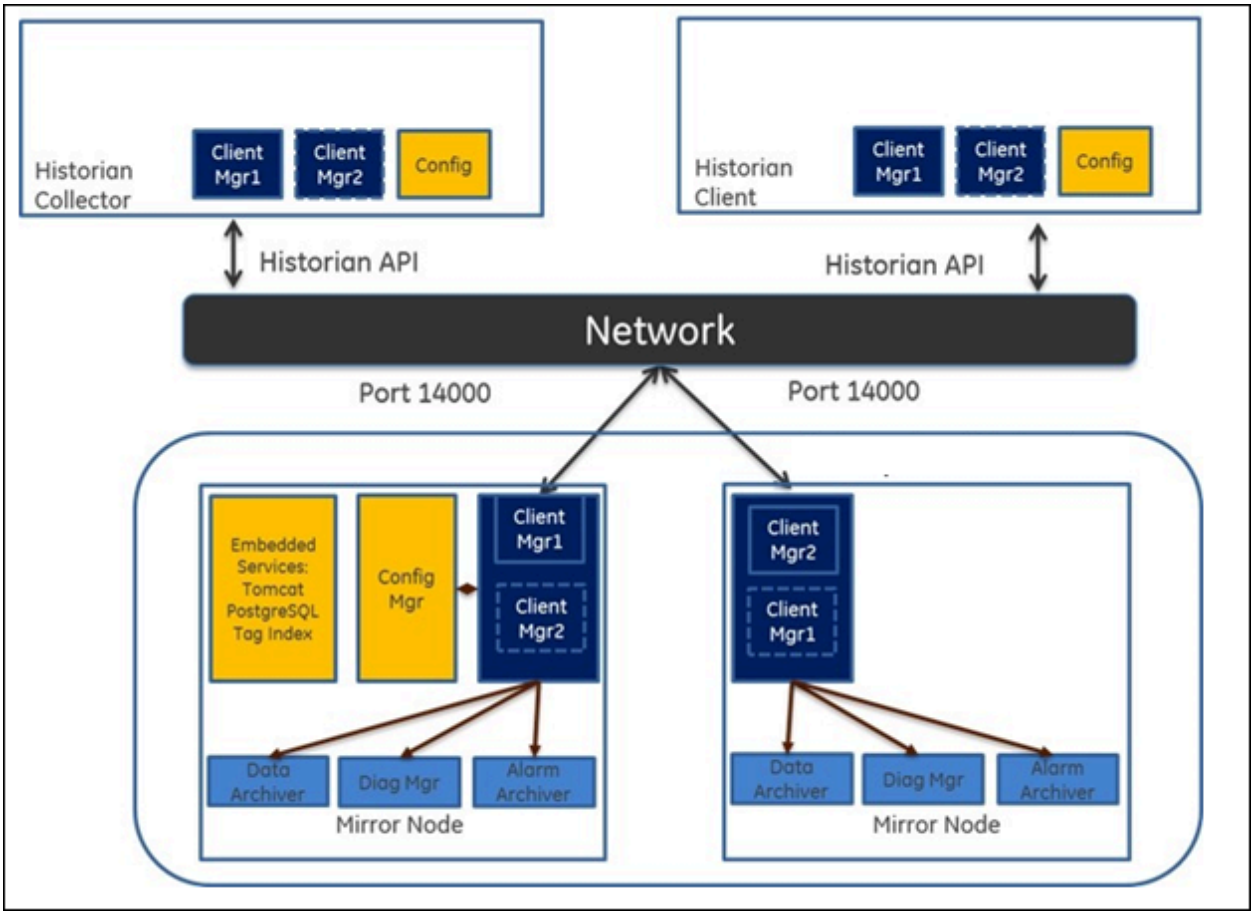
Historian provides mirroring of stored data on multiple nodes to provide high levels of data reliability. Data Mirroring also involves the simultaneous action of every insert, update and delete operations that occurs on any node. Data mirroring provides continuous data read and write functionality.

In a typical data mirroring scenario, one server acts as a primary server to which the clients connect. All communication goes through the Client Manager, and each Client Manager knows about the others. Mirrors must be set up in a single domain.

When you create a mirror location, you add one or more servers to the group, and then create the data stores whose data you want to replicate. For example, suppose you want to create a data store for collecting the data for 100 tags, for which you want high availability. In that case, you must create a mirror location, add two or more servers to the mirror location, and then create the data store. When you do so, the data retrieved in the data store is stored in all the servers in the mirror location. If one of the servers is down, you can retrieve the data from the other servers in the group.

Mirror Node Setup

The following diagram helps you to understand a typical single mirror node setup.



Create a Mirror Location

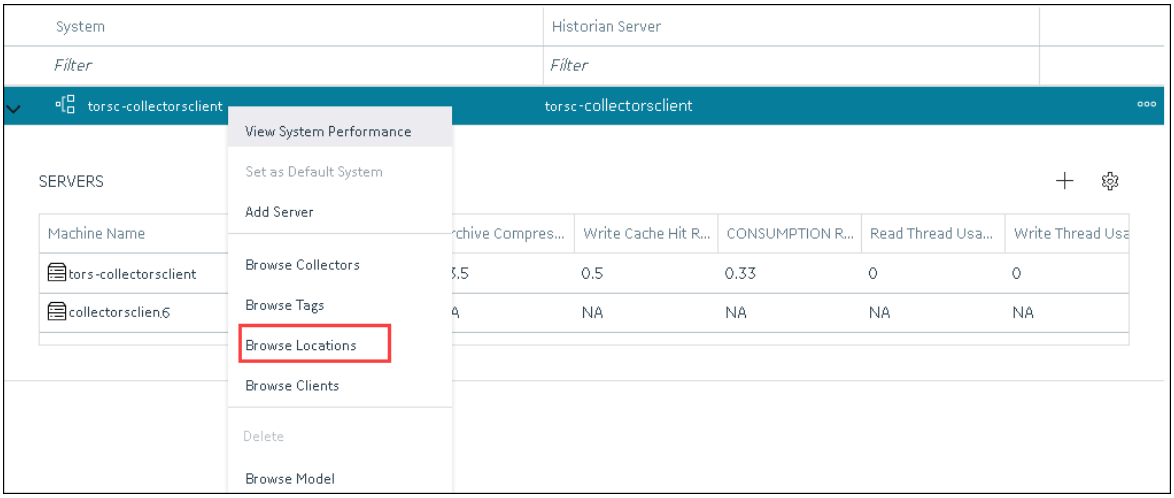
Add one or more distributed servers *(on page 1080)* to the system in which you want to create a mirror group.

If you want high availability of one or more data stores, you must create a mirror group (also called a mirror location), and then add servers to it. When you do so, the data in the data stores of the mirror locations is replicated. Therefore, even if one of the servers is down, you can retrieve data from the other servers in the mirror location, thus achieving high availability.

The following conditions apply when you create a mirror location:

- You must add minimum two servers to a mirror location. The maximum number of servers that you can add depends on your Historian license.
- You can add a mirror location only in a horizontally scalable Historian system.
- You can rename a mirror location, remove a machine from a mirror location, or add an additional one even after you create the mirror location. However, if only one machine remains in the group, you cannot remove it.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   The **Systems** section appears, displaying a list of systems.
3. Right-click the system in which you want to create a mirror location (or select ⋯), and then select **Browse Locations**.



   A list of distributed locations in the system appears.
4. Select **Mirror Locations**.
   A list of mirror locations in the system appears.
5. In the upper-right corner of the main section, select +.
   The **Add Mirror Location** window appears.
6. Provide values as described in the following table.

Field	Description
MIRROR LOCATION NAME	Enter a name for the mirror location. A value is required and must be unique for the system.
SERVER MACHINES	Select the servers that you want to add to the mirror group. This box contains a list of all the servers in the system. You must add minimum two servers to a mirror location.

7. Select **Add**.
   The mirror location is created.

Add a data store to the mirror location *(on page 1089)*.

Create a Data Store

The number of data stores that you can create depends on your license.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Sores**.
   Alternatively, you can select **Systems**, right-click the system in which you want to create a data store (or select), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Select .
   If Historian Standard version, then the **Add Data Store** window appears.

   If Historian Enterprise version, then the **Add Data Store: <location name>** window appears.
4. Enter values as described in the following table.

Field	Description
DATA STORE NAME	Enter a unique name for the data store. A value is required. You can use all alphanumeric characters and special characters except / \ * ? < > |
DESCRIPTION	Enter a description for the data store.
LOCATION	Enter the host name or IP address of the distributed location on which you want to create the data store. This field is available only for a horizontally scalable system.
Is Default	Switch the toggle on if you want to set this data store as the default one. A default data store is the one that is considered if you do not specify a data store while adding a tag. You can set only one data store as default.

5. Select .
   The data store is created.

   When you add tags to the data store, it will have its own set of .IHA (iHistorian Archive) files. Ensure that you back up the new data store archives periodically.

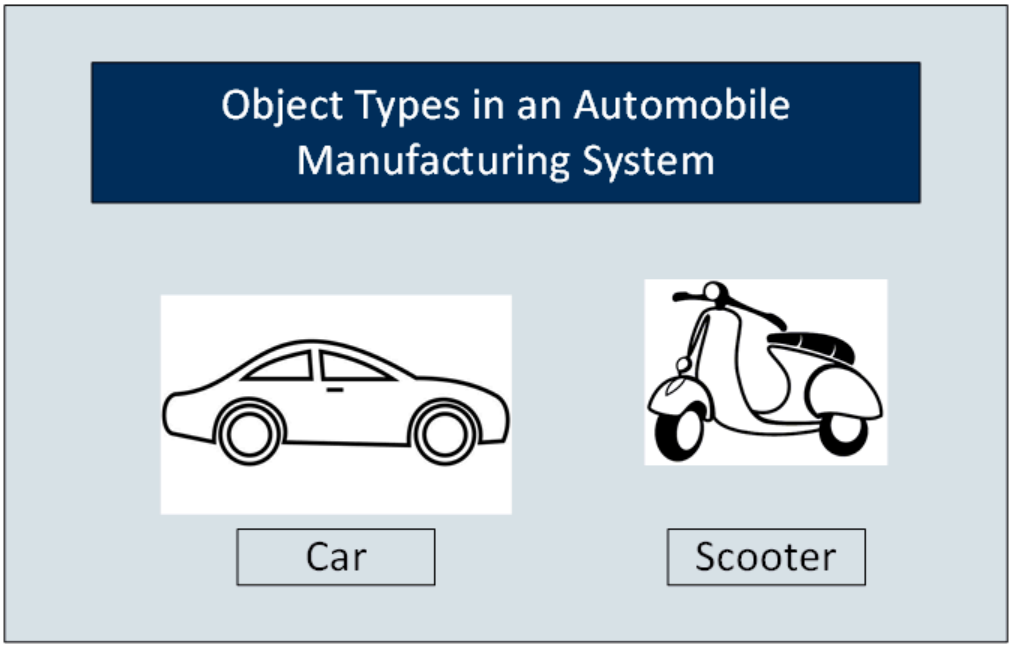
Creating a Model

About a Historian Model

A Historian model is a hierarchical classification of various objects in a system. A model contains the following components:

- Object Types
- Contained Types
- Object Instances
- Variables

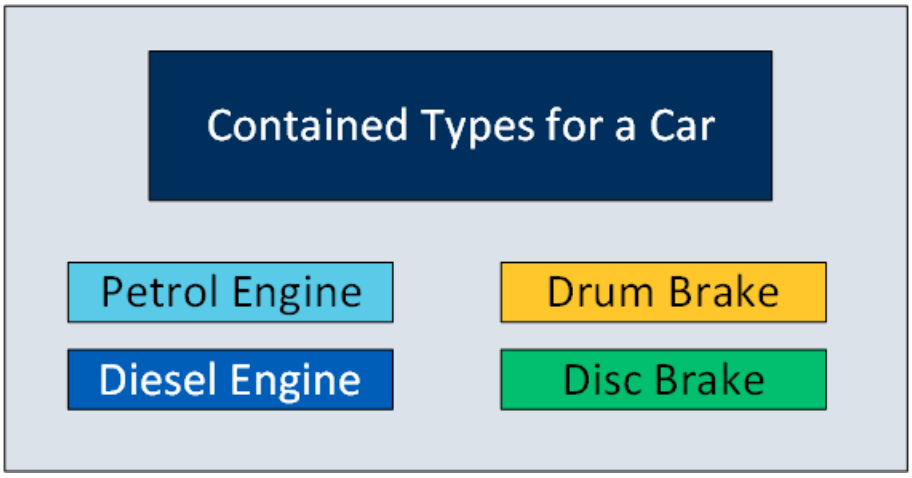
Object Type: An object type is a blueprint, which you want to replicate that will have a common structure (common properties/attributes and contained types). These object types can be the products you manufacture, your assets, byproducts, or anything else for which you want to classify information hierarchically and inherit properties/attributes. For example, in an automobile manufacturing unit, the vehicles you manufacture are object types (for example, a car or a scooter).



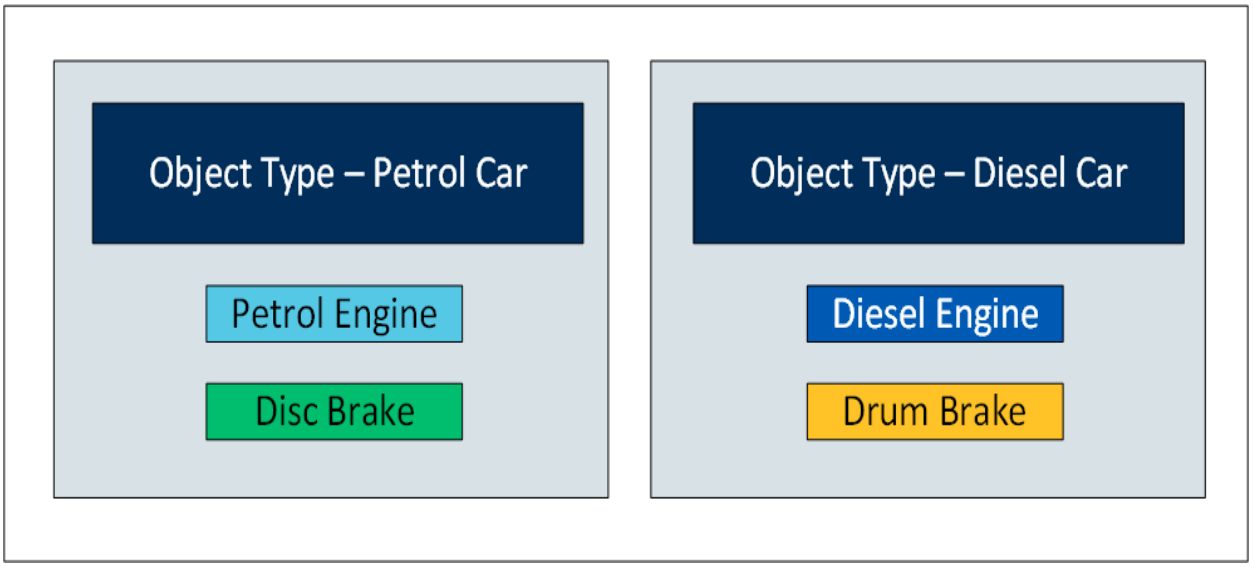
Contained Types: A contained type is an object type that you can include in another object type. For example, suppose you manufacture cars with the following types of engines:

- Petrol
- Diesel

You can then create one contained type for a petrol engine and one for a diesel engine. Similarly, you can create contained types for various types of brake systems, testing parameters, and so on.

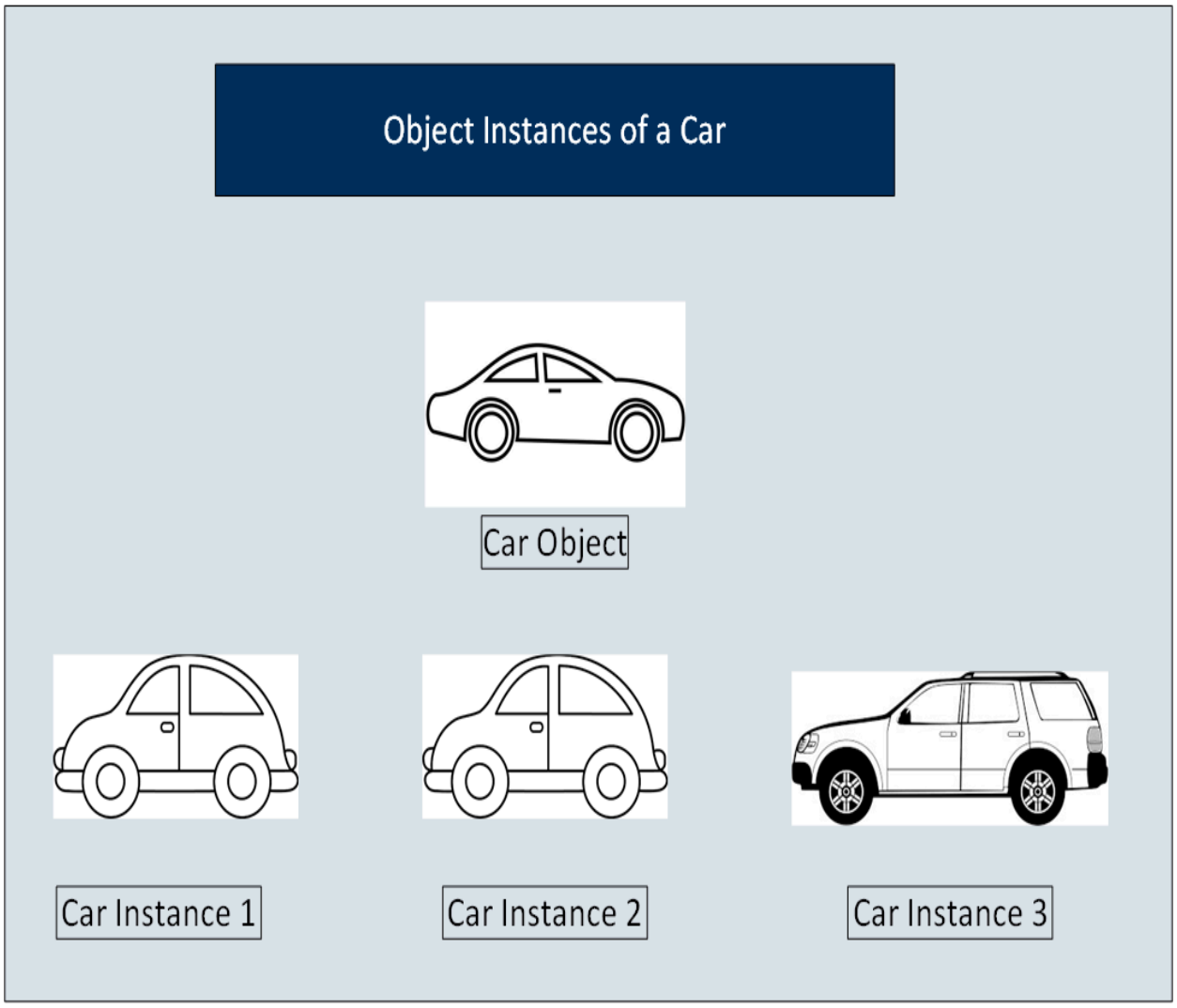


When you create an object type for a car, you can include any of these contained types.



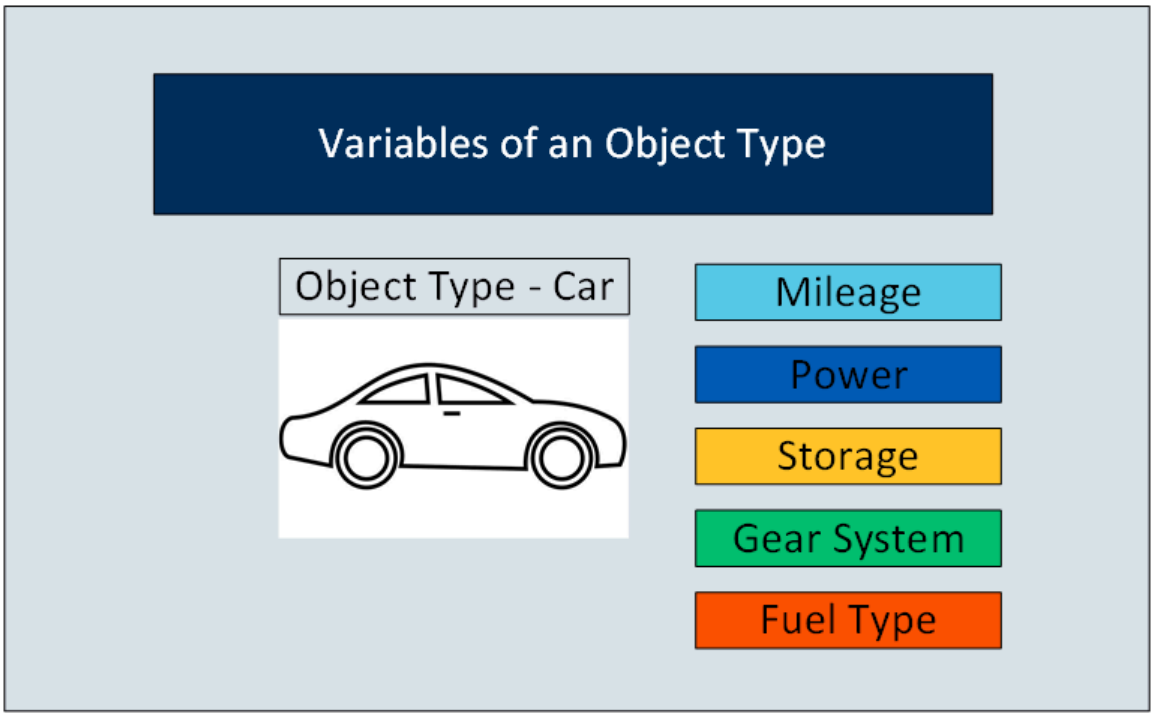
You can include multiple contained types in a single object instance. In addition, you can include a single contained type in multiple object instances.

Object Instances: Each item of an object type that you manufacture is called an object instance. For example, if you manufacture three cars, each one is an instance.



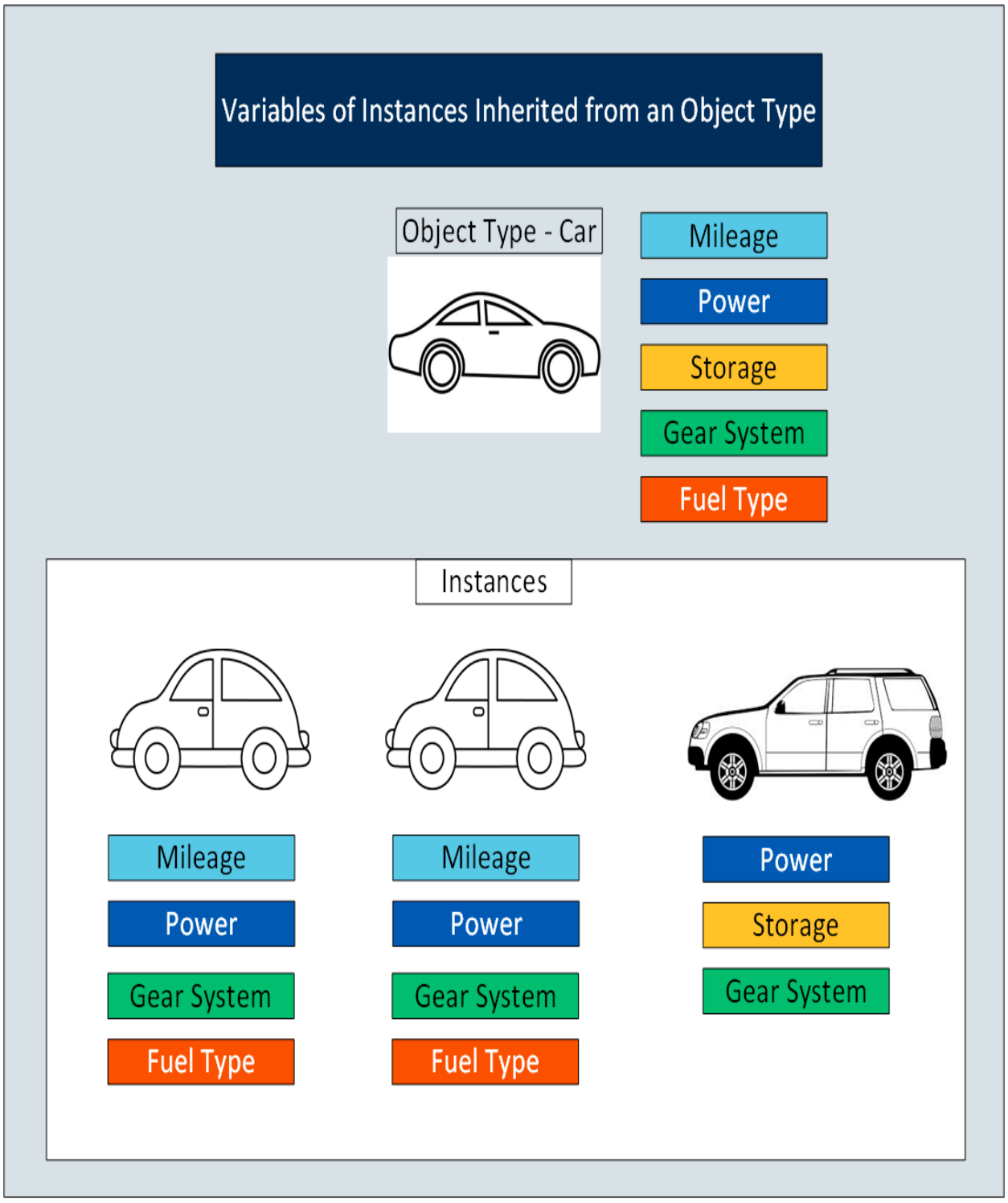
An object instance is specific to a Historian system. An object type, however, is not associated with a system.

Variables: Each attribute or property of an object is called a variable. These variables are common across all objects of a certain type. They represent tags whose values are collected by data collectors. For example, a car can have the following variables.



When you create instances of an object type, by default, the variables in the object type are inherited to all the instance as well. You can choose to include or exclude one or more of these variables for each instance.

In the following image, all the variables of the car object type are inherited to each of the instances. However, the first two instances do not include Storage. And the third instance does not include Mileage and Fuel Type.



If an object type contains contained types, the variables in the contained types are inherited as well.

After you create an object instance, you must store the values of each variable of the instance. To do so, you must map each variable with a Historian tag or create one, depending on the type of the variable.

Types of Variables:

- **Direct:** Tags for these variables are created in Historian when you select a collector instance. For instructions on collecting data for these types of tags, refer to Collect Data for a Direct Variable *(on page 1111)*.
- **Indirect:** These variables are mapped with existing Historian tags. For instructions on collecting data for these types of tags, refer to Collect Data for an Indirect Variable *(on page 1114)*.
- **Static:** These variables have a static value, which you provide when you create an object instance. For instructions on providing data for these types of tags, refer to Provide Data for a Static Variable *(on page 1109)*.

Limitations:

- An OPC UA model is not supported.
- If the name of a tag associated with a variable in a model contains a period (.), you cannot import the tag while importing the model into a Historian system.

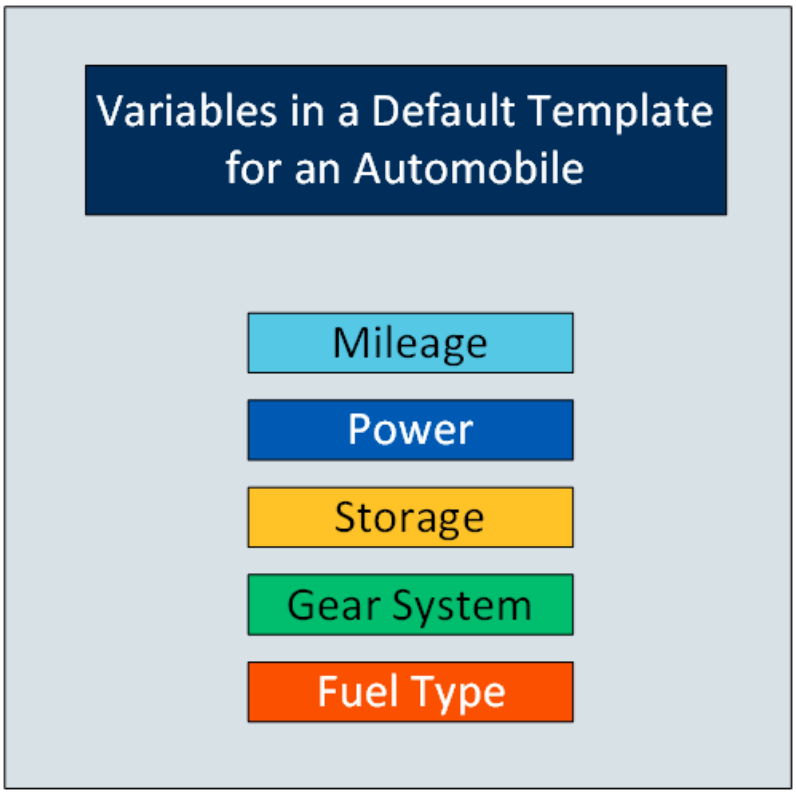
About Object Templates

When you create an object type, you create a template. A template contains attributes/properties of an object type, called variables. When you apply a template to an object instance, the variables included in the template are added to the object instance.

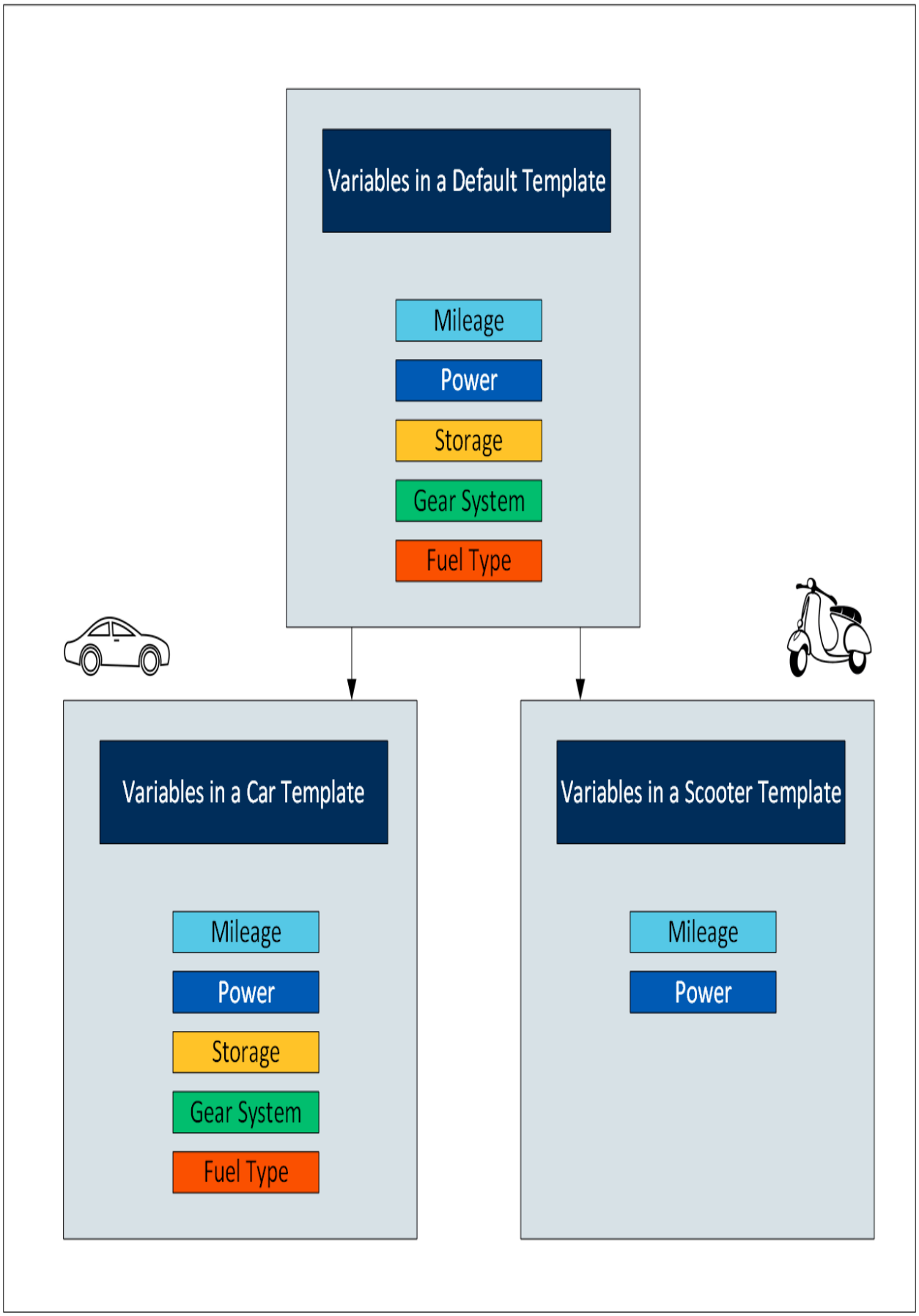
Types of Templates:

- **Default Template:** The default template contains generic/common variables of an object type. Each object type contains one and only one default template; you cannot delete it.
- **Custom Template:** In addition to the default template, if needed, you can create one or more custom templates for an object type. When you do so, you can choose to include variables from the default template or other custom templates in the same object type.

For example, suppose you have an automobile manufacturing unit. You can create a default template that contains generic details about an automobile. Each of these details is a variable.



In addition to the default template, you can create custom templates for the object type, and add variables to it. For example, in the automobile object type, you can create a template for a car and another one for a scooter. Some of the variables in the default template (such as storage and gear system) may not be applicable to a scooter. Therefore, you can exclude them.


Variables in a Default Template
Mileage
Power
Storage
Gear System
Fuel Type
Variables in a Car Template
Mileage
Power
Storage
Gear System
Fuel Type
Variables in a Scooter Template
Mileage
Power

When you later create instances of the object type, you can choose any of the three templates. When you do so, all the variables in the template are included in the object instance. You will then capture values of these variables in Historian.

Workflow for Creating a Historian Model

To create a model and store tag values of object instances, you must perform the following steps.

Step Number	Description	Notes
1	Set up Configuration Hub *(on page 1023)*.	This step is required. It involves installing the required components to get started with Configuration Hub.
2	Create a collector instance *(on page 1076)*.	This step is required. It involves creating a collector instance using which you want to collect data from the object instance and store it in an on-premises Historian server or a cloud destination.
3	Specify the tags for data collection *(on page 1077)*.	This step is required. It involves specifying the tags for which you want to collect data by browsing through the tags in the data source. For example, for an iFIX collector, if there are 1,00,000 tags in the iFIX server, you must specify the ones for which you want to collect data. Only then data is collected for those tags. You will later map these tags with the variables in each object instance, thus collecting data for the variables (explained later in this workflow).
4	Create an object type *(on page 1099)*.	This step is required. It involves creating an object type, a default template, one or more custom templates as needed, and adding variables to each object type.
5	Create an object instance *(on page 1107)*.	This step is required. It involves creating an object instance and applying the required

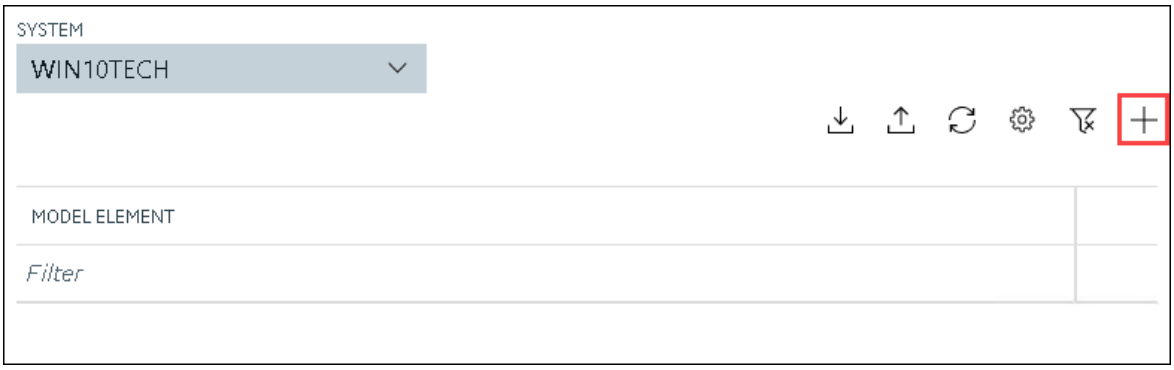
Step Number	Description	Notes
		template from the object type. The object instance then inherits the variables from the object type.
6	Provide/collect data for static *(on page 1109)*, direct *(on page 1111)*, and indirect *(on page 1114)* variables.	This step is required. You can provide data for the following types of variables: • **Static:** For a static variable, the value does not change; therefore, you just provide the value of the variable. • **Direct:** For a direct variable, you associate the variable with a collector instance and a tag. When you do so, the tag is created in Historian, and values for the variable are collected by the collector instance and stored in Historian. • **Indirect:** For an indirect variable, you associate the variable with a collector instance and an *existing* Historian tag. The values for the variable are then collected by the collector instance and stored in Historian. For more information on the types of variables, refer to About a Historian Model *(on page 1090)*.

Create an Object Type

When you create an object type, you also create the default template, custom templates, and variables for each template. For information on each of these template types and variables, refer to About Object Templates *(on page 1095)* and About a Historian Model *(on page 1090)*.

This topic describes how to create an object type. You can also copy one *(on page 1122)*.

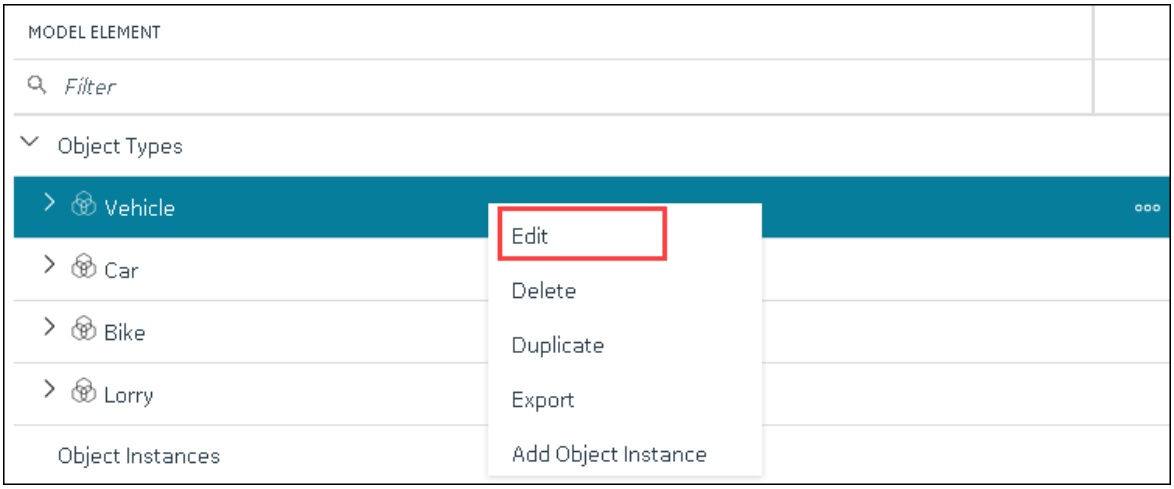
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. In the upper-right corner of the section, select +.



   The **New Object Type** window appears.
4. Enter values as described in the following table.

Field	Description
NAME	Enter a name for the object type. A value is required and must be unique. The value that you enter: ◦ Must begin with a letter or a number. ◦ Can contain up to 256 characters. ◦ Can include any of the following special characters: /!|#{}%$-_ ◦ Must not include a space or any of the following characters: ~`+^:;.,?"*=@
DESCRIPTION	Enter a description for the object type.

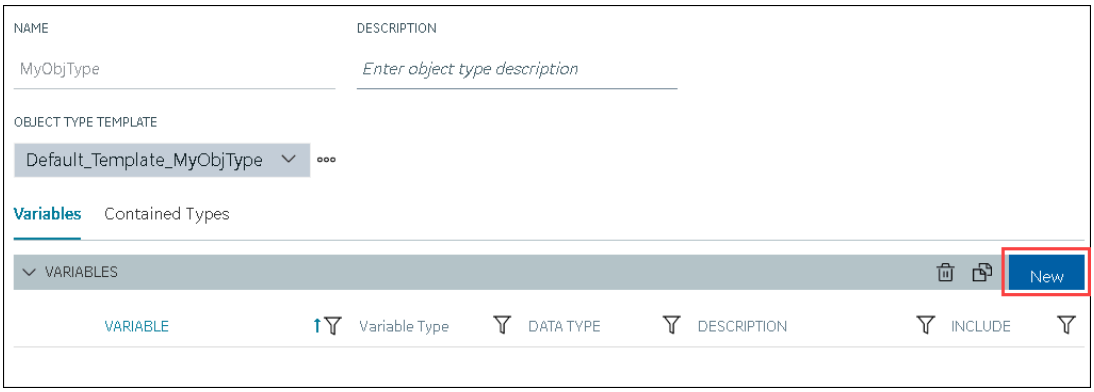
5. Select **Create**.
   The object type is created.
6. In the main section, under **Object Types**, right-click the object type that you have created (or select ⋯), and then select **Edit**.



The **<object type name>** section appears. The **OBJECT TYPE TEMPLATE** field contains the default template.

7. To add variables to the default template:

   a. In the **Variables** table, select **New**.



   A blank row appears in the table.

   b. Enter values as described in the following table.

Column	Description
VARIABLES	Enter the name of the variable. A value is required and must be unique for the object type. The value that you enter: ▪ Must begin with a letter or a number. ▪ Can contain up to 256 characters.

Column	Description
	▪ Can include any of the following special characters: /!|#{}%$-_ ▪ Must not include a space or any of the following characters: ~` +^:;.,?"*={}@
VARIABLE TYPE	Choose one of the following types of variables: ▪ **Direct:** Tags for these variables are created in Historian for a selected collector instance. ▪ **Indirect:** These variables are mapped with existing Historian tags. ▪ **Static:** These variables have a static value, which you provide when you create an object instance.
DATATYPE	Select the data type of the variable.
DESCRIPTION	Enter a description for the variable.
INCLUDE	Switch the toggle to indicate whether you want to include the variable in the template.

Note:
After you apply a template to an object instance, you cannot modify or delete a variable in the object type; you can only add more variables. You can, however, copy the object type *(on page 1122)*, and modify or delete variables in the copied one.

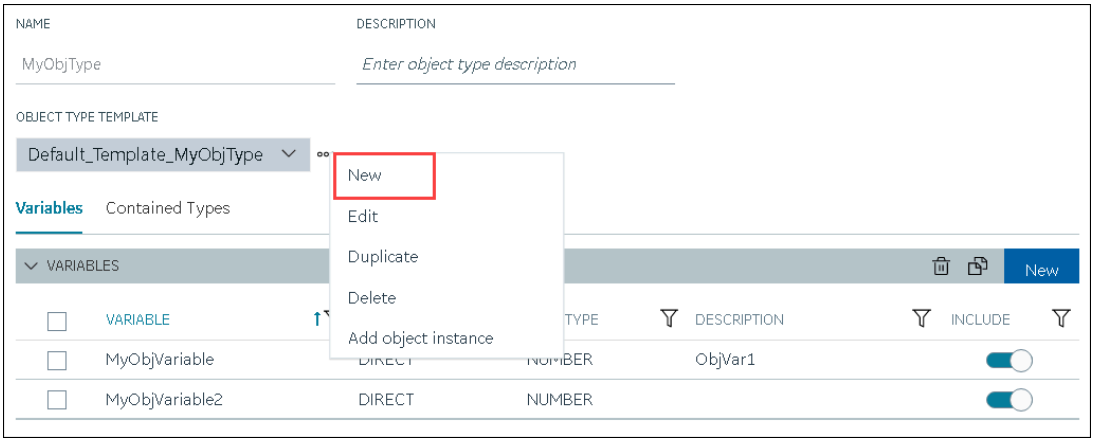
c. Press ENTER.

The default template is created, along with the variable that you have added. You can add more variables or include/exclude variables later too.

Note:
If you want to create a variable by copying an existing one, select the check box next to the variable that you want to copy, and then select  . You can copy only one variable at a time.

8. To create a custom template:

   a. Next to the **TEMPLATE** field, select ooo, and then select **New**.



   The **New Object Template** window appears.

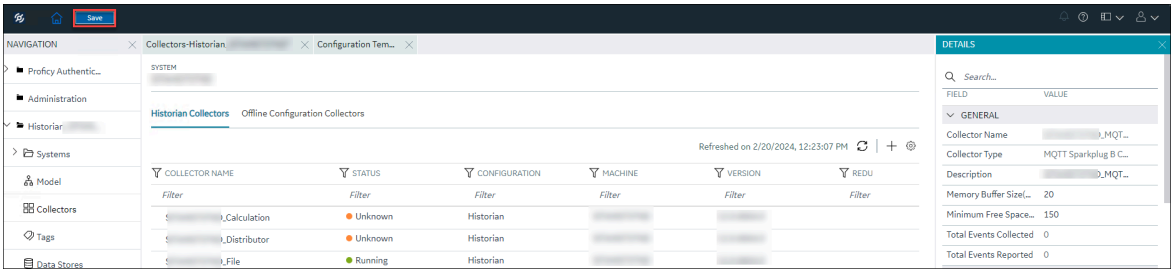
   b. Enter values as described in the following table.

Field	Description
NAME	Enter a name for the template. A value is required and must be unique. The value that you enter: ▪ Must begin with a letter or a number. ▪ Can contain up to 256 characters. ▪ Can include any of the following special characters: /!|#{}%$-_ ▪ Must not include a space or any of the following characters: ~` +^:;.,?"*={}@
DESCRIPTION	Enter a description for the template.

   c. Repeat step 7 to add variables to the custom template.

   The custom template is created, along with the variables. You can add more variables, and include/exclude existing variables later too.

9. In the upper-left corner of the page, select **Save**.



The object type, along with the default template, custom templates, and variables, is created.

Create an object instance *(on page 1107)*.

Include a Contained Type in an Object Type

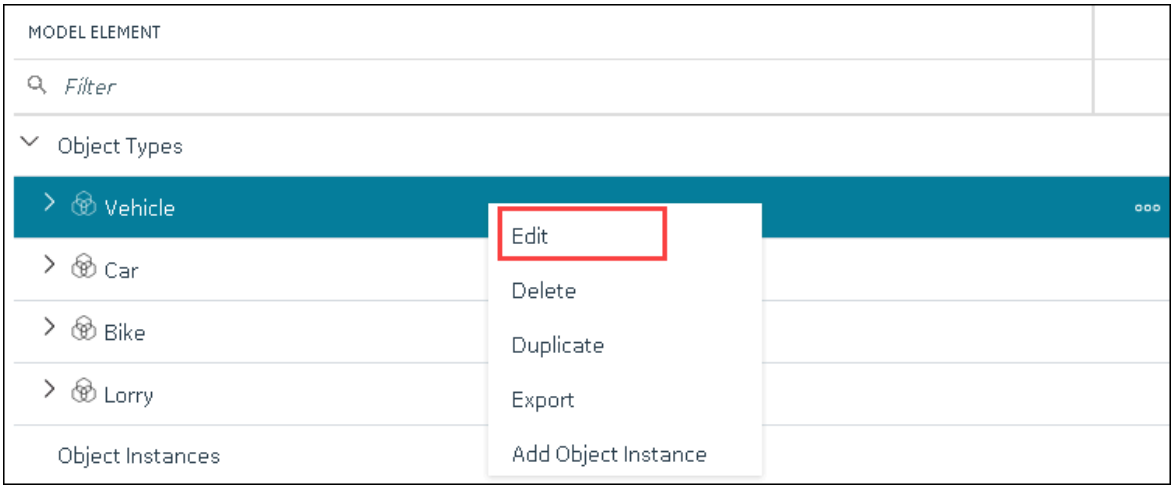
Create an object type *(on page 1099)* that you want to use as a contained type.

A contained type is an object type that you can include in another object type. When you do so, you can reuse the variables in the contained type without creating them again manually. These variables are inherited by object instances of the object type in which you include the contained type.

You can include a single contained type in multiple object types and multiple contained types in a single object type.

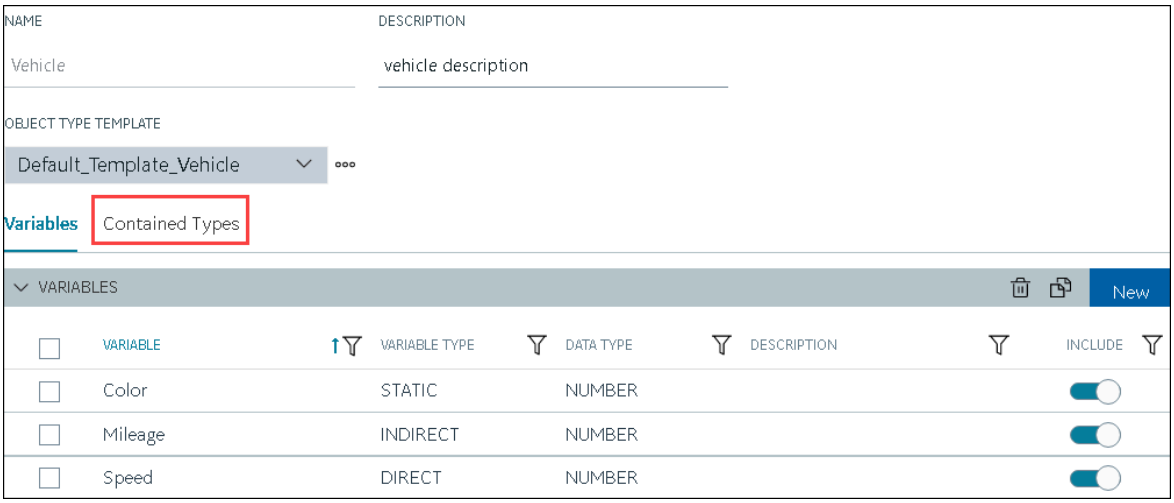
For more information, refer to About a Historian Model *(on page 1090)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a contained type, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. Under **Object Types**, right-click the object type in which you want to include the contained type (or select ⋯), and then select **Edit**.



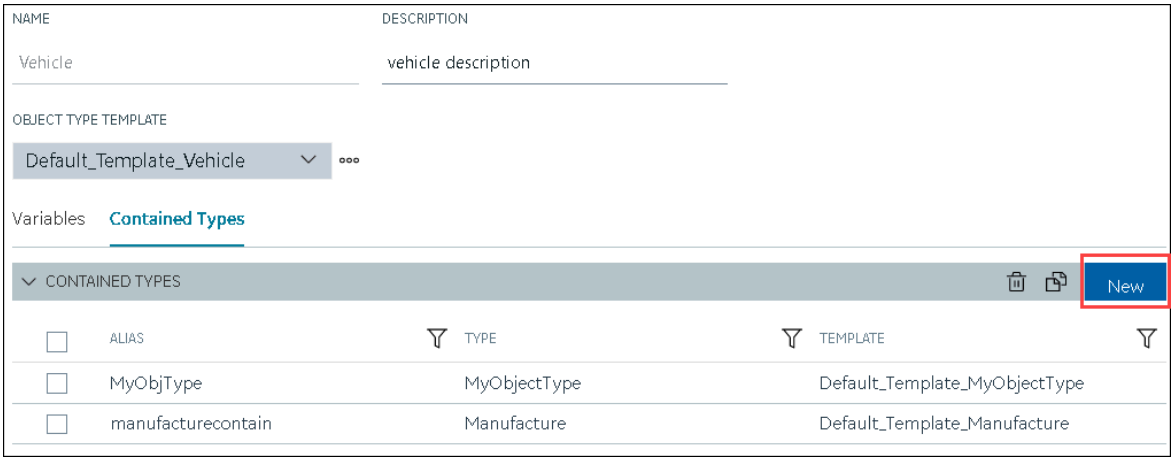
The **<object type name>** section appears, displaying a list of variables in the object type.

4. Select **Contained Types**.



A list of contained types in the object type appears.

5. In the **CONTAINED TYPES** table, select **New**.



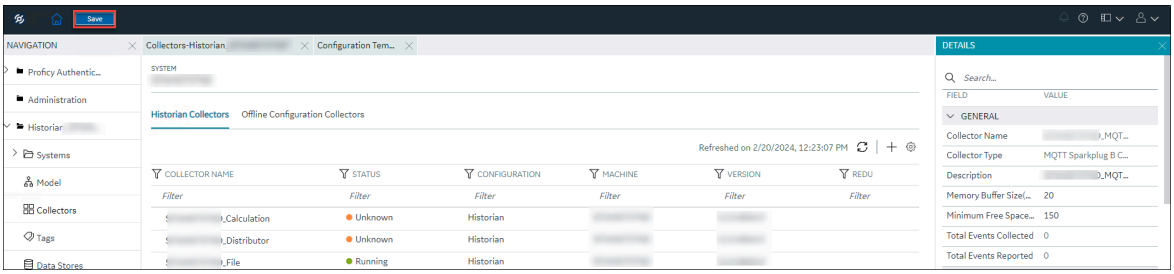
A blank row appears in the table.

6. Enter values as described in the following table, and press ENTER.

Field	Description
ALIAS	Enter a name for the contained type. A value is required. It need not match the original name of the contained type that you want to include. The value that you enter: ◦ Must begin with a letter or a number. ◦ Can contain up to 256 characters. ◦ Can include any of the following special characters: /!|#{}%$-_ ◦ Must not include a space or any of the following characters: ~`+^:;.,?"*=@
TYPE	Select the object type that you want to include as a contained type. This field contains a list of all the object types in the Historian system.
TEMPLATE	Select the template from the object type that you want to include. This field contains a list of templates in the object type. Only the variables in the selected template will be inherited by instances of the object type in which you want to include the contained type.

The contained type is included in the object instance.

7. In the upper-left corner of the page, select **Save**.



   The changes to the object type are saved.

Create an object instance *(on page 1107)*. The object instance will include the variables directly added in the object type, along with the ones in the selected template in the contained type.

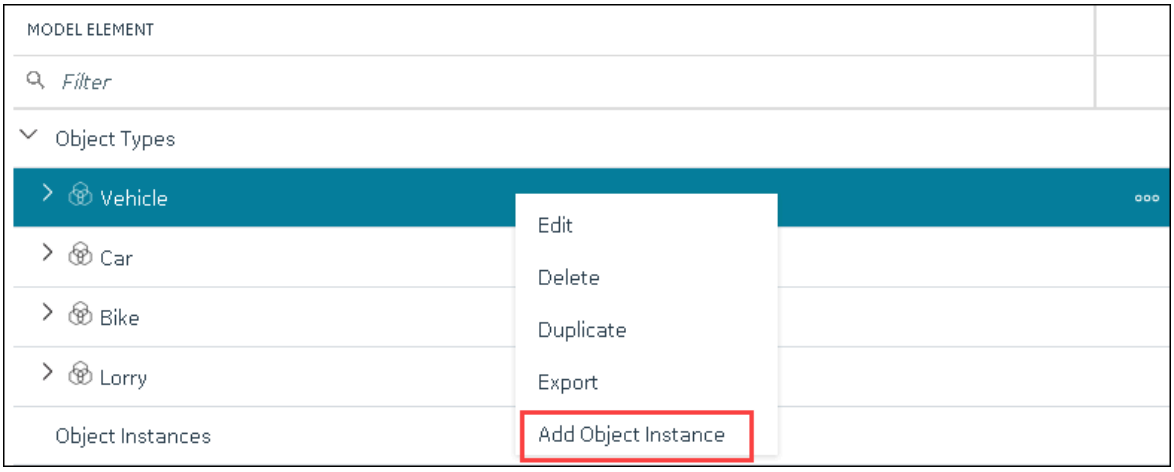
Create an Object Instance

Create an object type *(on page 1099)*.

For each item of an object type, you must create an object instance so that you can capture values of the variables in the instance. These values are then stored in Historian.

> **Note:**
> After you create an object instance, you cannot rename, import, export, or delete a variable, contained types, or templates in the associated object type; you can only create new ones.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. In the **SYSTEM** list, select the system in which you want to create an object instance.
4. Under **Object Types**, right-click the object type whose instance you want to create (or select ⋯), and then select **Add Object Instance**.



The **New Object Instance** window appears.

5. Enter values as described in the following table.

Field	Description
NAME	Enter a name for the object instance. A value is required and must be unique for the object type. The value that you enter: ◦ Must begin with a letter or a number. ◦ Can contain up to 256 characters. ◦ Can include any of the following special characters: /!|#{}%$-_ ◦ Must not include a space or any of the following characters: ~`+^:;.,?"*=@
DESCRIPTION	Enter a description for the object instance.
OBJECT TYPE	This field is disabled and populated with the object type that you have selected.
OBJECT TYPE TEMPLATE	Select the template that you want to apply to the object instance. **Note:** After you apply a template to an object instance, you cannot modify or delete a

Field	Description
	variable in the object type; you can only add more variables.

6. Select **Create**.
   The object instance is created.
7. In the **Model** section, under **Instances**, expand the instance that you have created, and then expand **Variables**.
   A list of variables inherited from the template in the object type appear.
8. Select a variable.
   The details of the variable appear in the **DETAILS** section.

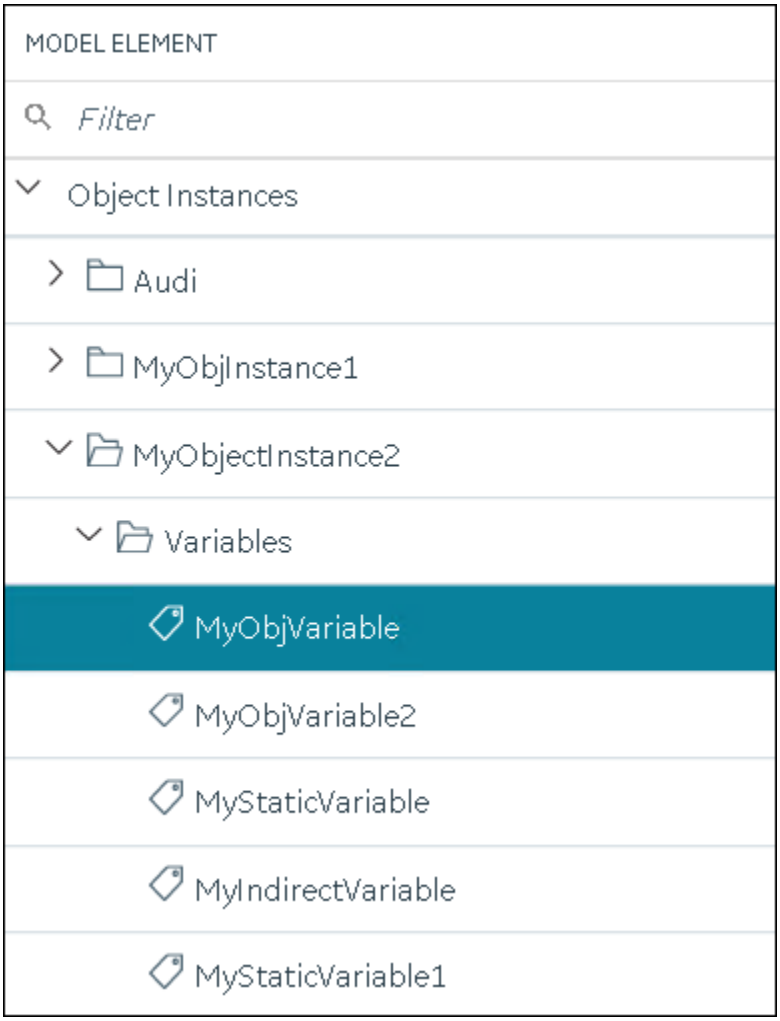
> **Tip:**
> If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **DETAILS**.

- Provide data for static variables *(on page 1109)*.
- Collect data for direct *(on page 1111)* and indirect *(on page 1114)* variables.

Provide Data for a Static Variable

A static variable contains a fixed value. Therefore, when you create an object instance, you can access the variable, and provide its value.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select , and then select **Browse Model**.
   The **Model** section appears.
3. Under **Object Instances**, expand the object instance, expand **Variables**, and then select the variable whose data you want to provide.

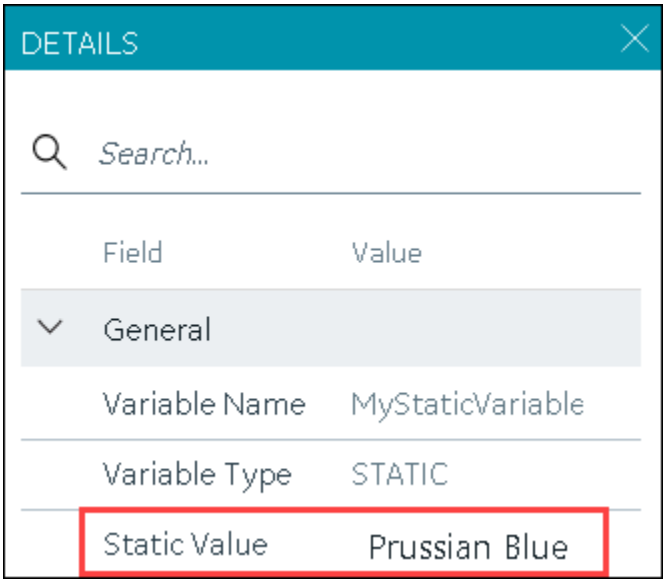


The details of the variable appear in the **DETAILS** section.

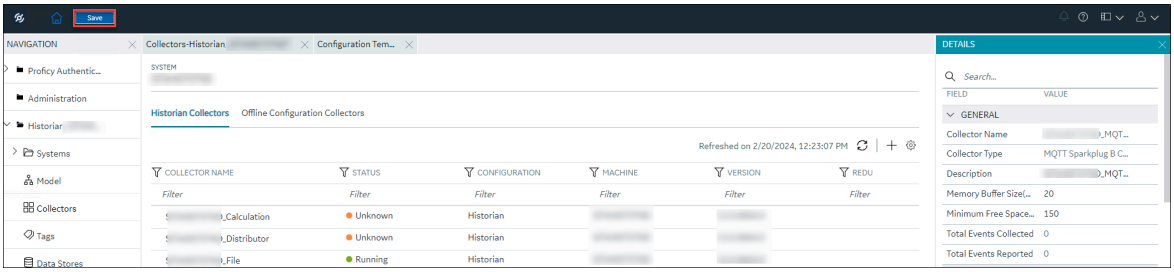
Note:

If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **DETAILS**.

4. In the **DETAILS** section, in the **Static Value** field, enter the value that you want to provide for the variable, and then press ENTER.



5. In the upper-left corner of the page, select **Save**.



The value for the variable is saved.

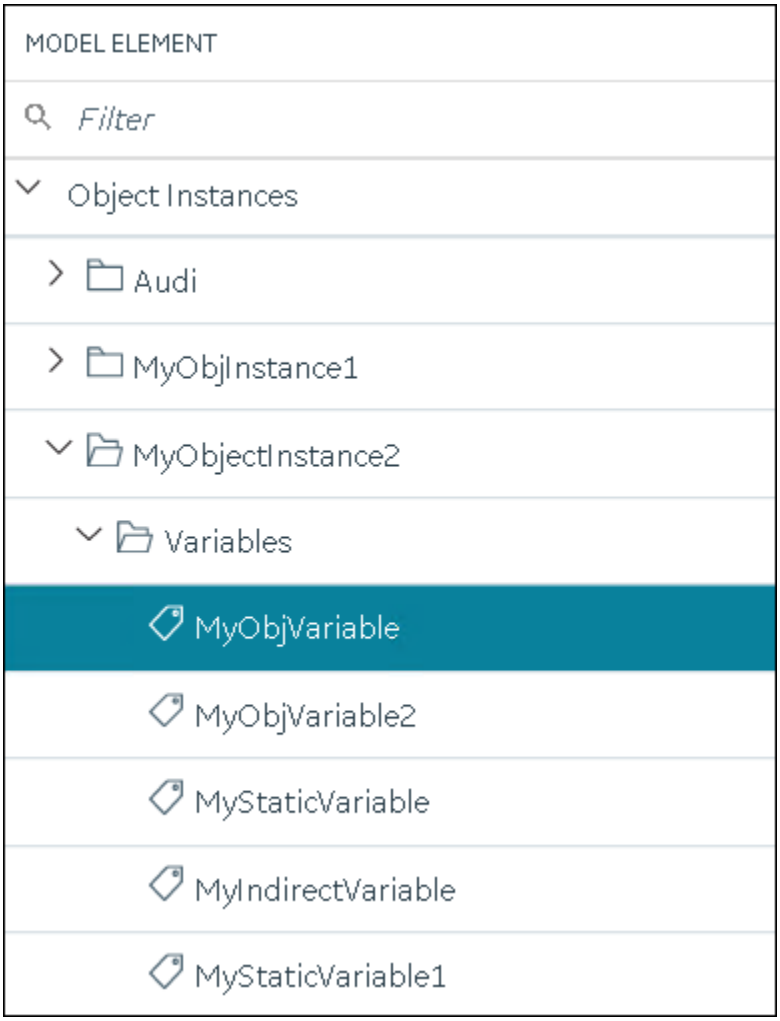
Collect Data for a Direct Variable

1. Create a collector instance *(on page 1076)* using which you want to collect data for the variable.
2. Add the tag *(on page 1077)* using which you want to collect data.

To collect data of a direct variable, you must associate the variable with a collector instance and a tag. When you do so, the tag is created in Historian, and values for the variable are collected by the collector instance and stored in Historian.

Important:
If the name of a tag associated with a variable in a model contains a period (.), you cannot import the tag while importing the model into a Historian system.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. Under **Object Instances**, expand the object instance, expand **Variables**, and then select the variable whose data you want to collect.

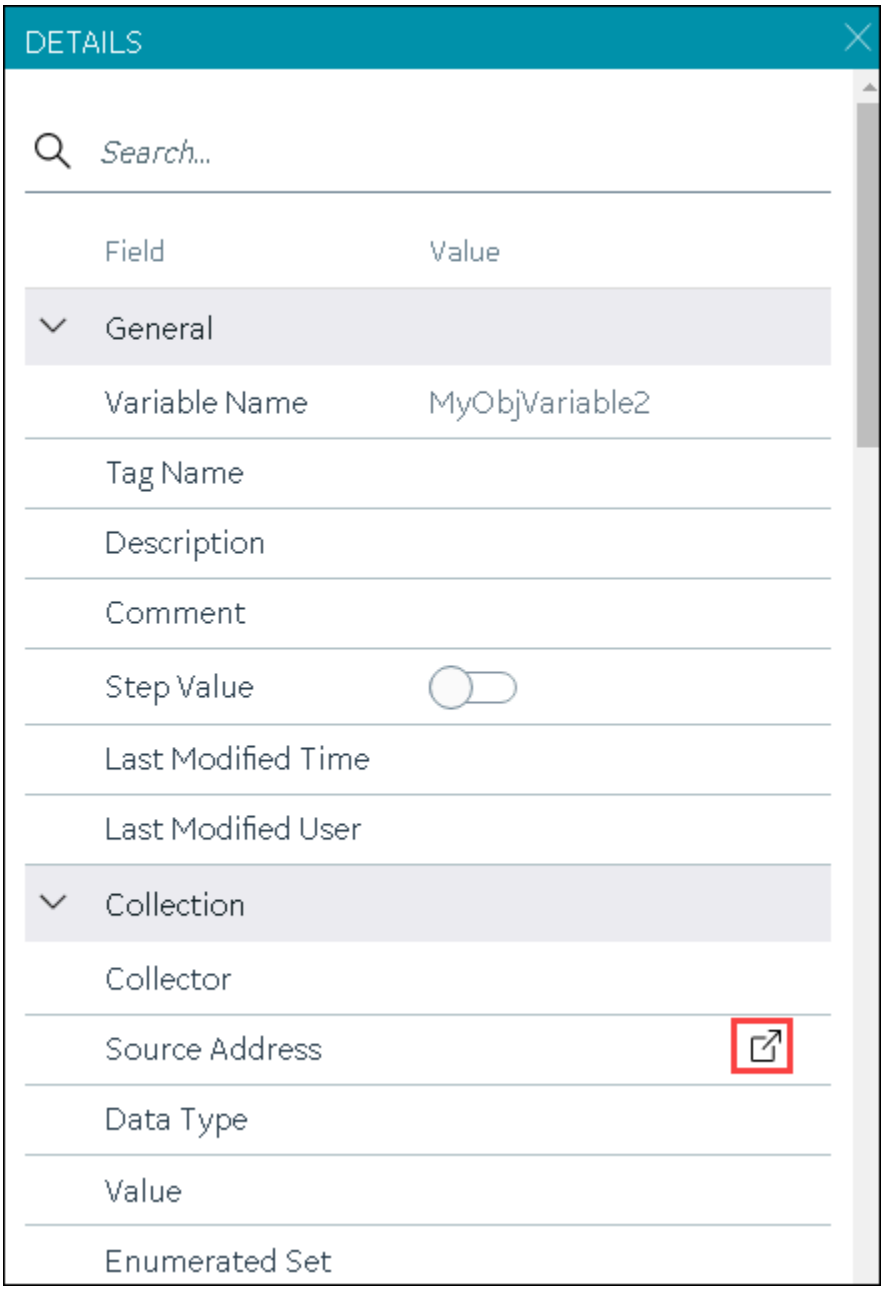


The details of the variable appear in the **DETAILS** section.

Note:

If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **DETAILS**.

4. In the **Source Address** field, select .

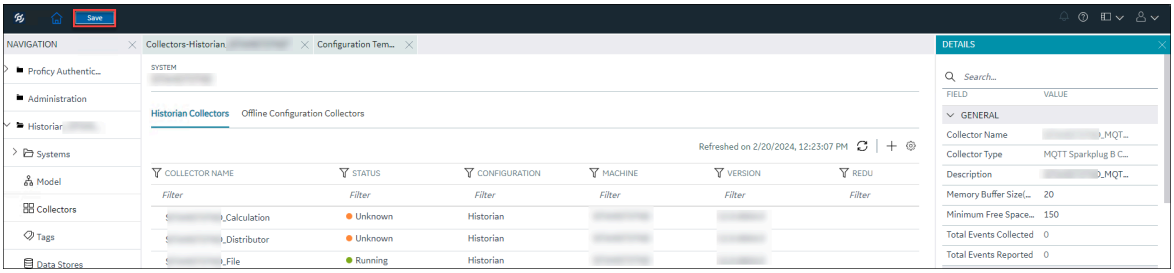


The **Browse Source Tag** window appears.

5. Enter values as described in the following table.

Field	Description
COLLECTOR NAME	Enter the name of the collector using which you want to collect data of the variable. A value is required.
COLLECTED TYPE	Specify whether you want to browse through all the tags in the data source or only from the tags that you have not added yet. A value is required.
SOURCE TAG NAME	Enter the name of the tag (either completely or partially) to narrow down the search results.
SOURCE TAG DESCRIPTION	Enter the description of the tag (either completely or partially) to narrow down the search results.

6. Select **Search Tags**.
   A list of tags that match *all* the search criteria appears.
7. Select the collector tag that you want to map with the variable, and then select **Apply**.
8. In the upper-left corner of the page, select **Save**.



The tag is mapped with the variable. A corresponding tag is created in Historian. The details of the tag and the collector instance are disabled and populated in the **DETAILS** section. All the data that is collected for the tag is now stored in Historian (or in a cloud destination as configured in the collector instance).

Collect Data for an Indirect Variable

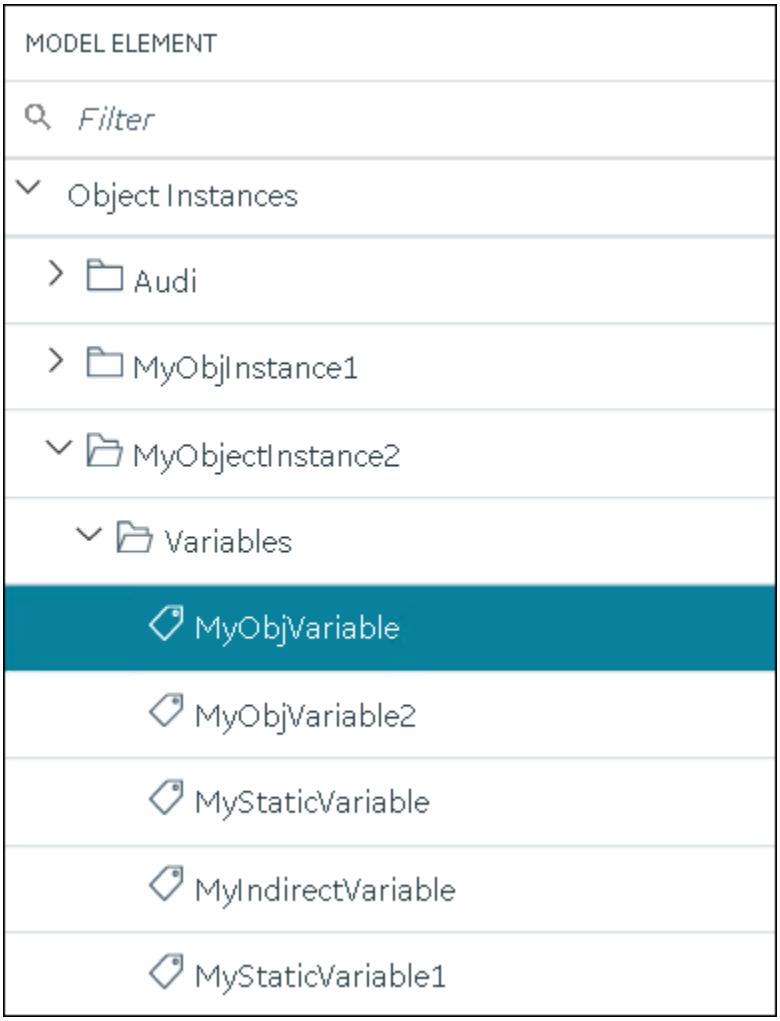
1. Add or ensure there is a collector instance *(on page 1076)* which you want to collect data for the variable.
2. Add the tag *(on page 1077)* that you want to map with the variable.

To collect data of an indirect variable, you must associate the variable with a collector instance and an existing Historian tag. The values for the variable are then collected by the collector instance and stored in Historian.

Important:

- If the name of a tag associated with a variable in a model contains a period (.), you cannot import the tag while importing the model into a Historian system.
- If you want to later delete the tag, first remove the mapping between the tag and the variable.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. Under **Object Instances**, expand the object instance, expand **Variables**, and then select the variable whose data you want to collect.

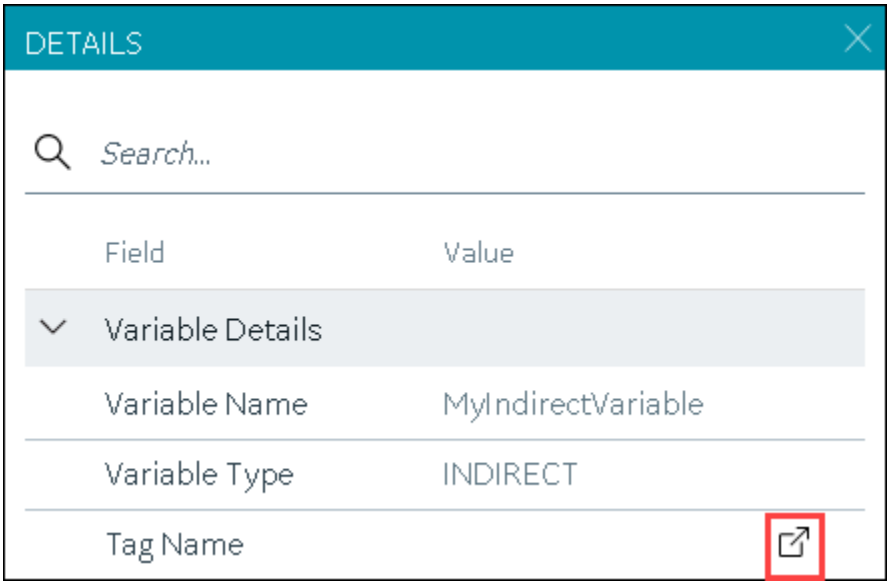


The details of the variable appear in the **DETAILS** section.

Note:

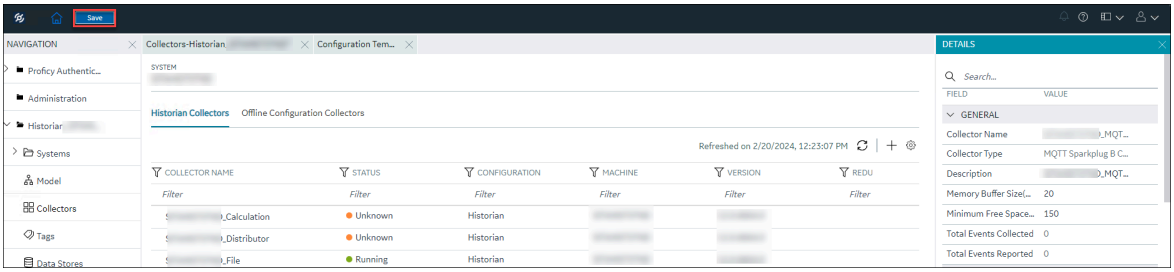
If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **DETAILS**.

4. In the **DETAILS** section, in the **Tag Name** field, select .



The **Tag Selection: <variable name>** window appears.

5. Select **Search** to search for tags.
6. Enter the search criteria, and then select **Search**. You can enter a name or a value partially or use the wildcard character asterisk (*). You can add more search criteria by selecting **Add Attribute**. The list of tags are filtered based on the search criteria.
7. Select the collector tag that you want to map with the variable, and then select **Apply**.
8. In the upper-left corner of the page, select **Save**.



You can choose any of the following options provided while mapping the indirect variable with an existing Historian tag to save in Historian with or without the model hierarchy.

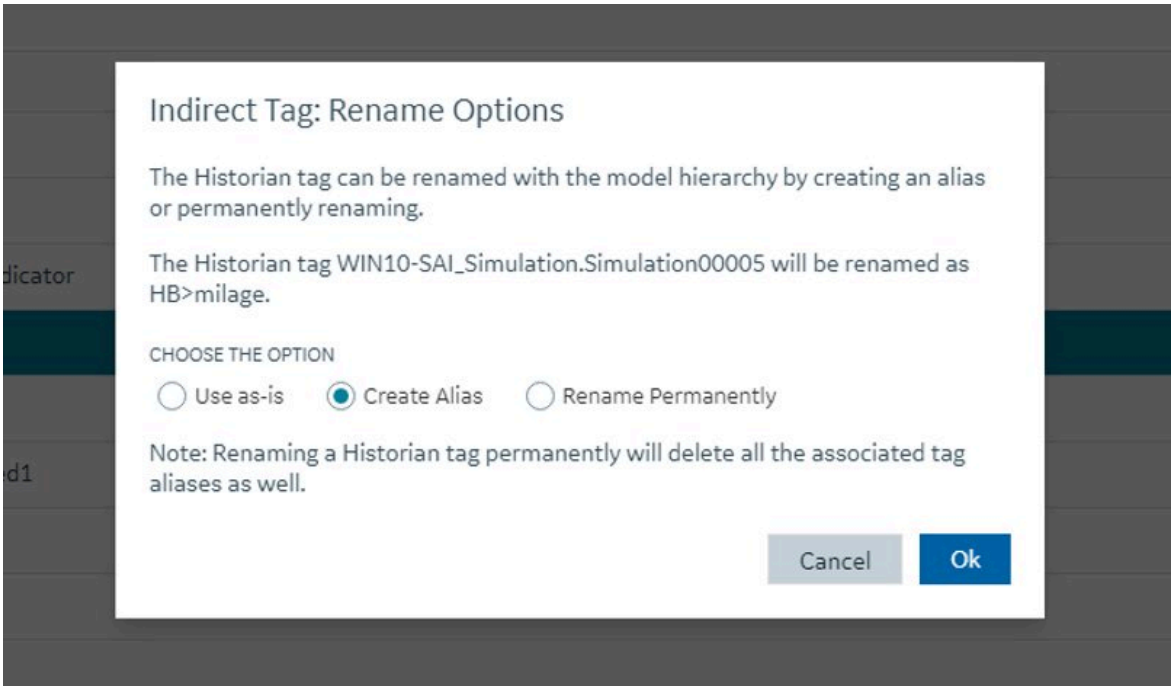


Table 16.

Field	Description
Use as is	Choosing this option will not update the Historian tag name. Mapping Information will be saved only in model database. Mapping information won't be available with Historian (when you export and try to trend with trending tools like Operations Hub, you will not be able to trend as they are connected to Historian Database).
Create Alias	Choosing this option creates an alias of Historian tag mapped with indirect variable. This option will save the model tag both in the model database and Historian database as an alias. When you export the model, you will be able to trend and see the data. (This is the default option.)
Rename Permanently	Choosing this option will permanently rename the Historian tag mapped with the model indi-

Field	Description
	rect variable and removes the existing tag. So, there will be chance that existing trends using this Historian tag might have impact.

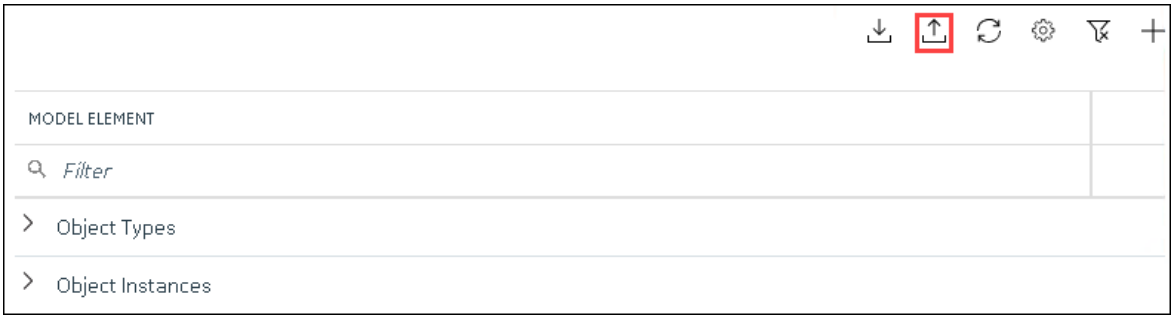
Export an Object Type/Instance

When you create an object type or an object instance, you can use it only in the Historian system in which you have created it. If, however, you want to use the object type/instance in a different Historian system or Operations Hub, you can export it and then import it into the other Historian system or Operations Hub.

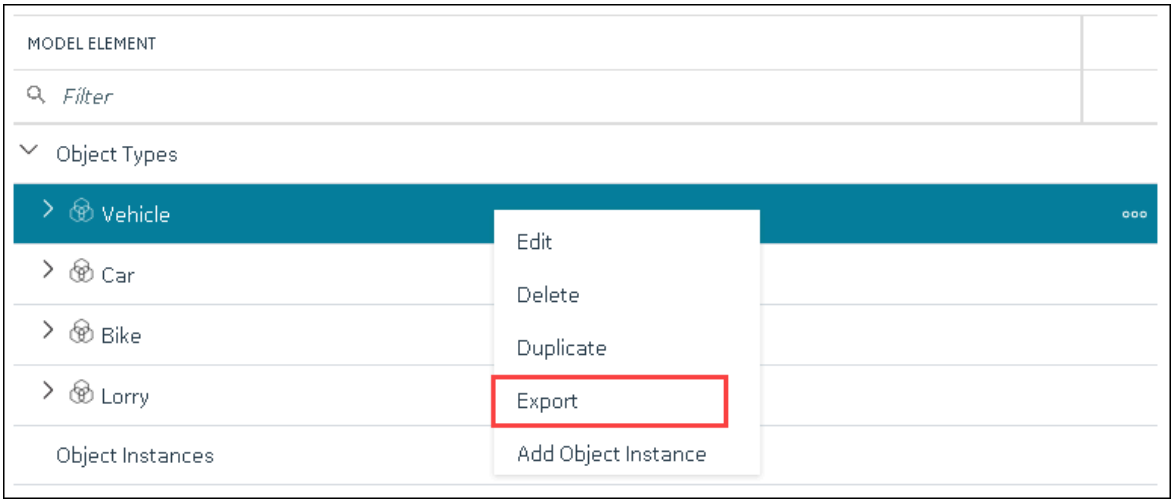
The following conditions apply when you export an object type/instance:

- You can export each object type/instance separately or all the object types and object instances in a Historian system at once.
- You can choose to export the variables or object instances of an object type (or both).
- You can choose to export the variables and templates of an object instance (or both). You cannot, however, export templates to Operations Hub.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**. Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. If you want to export all the object types/instances in the Historian system, in the upper-right corner of the main section, select  .

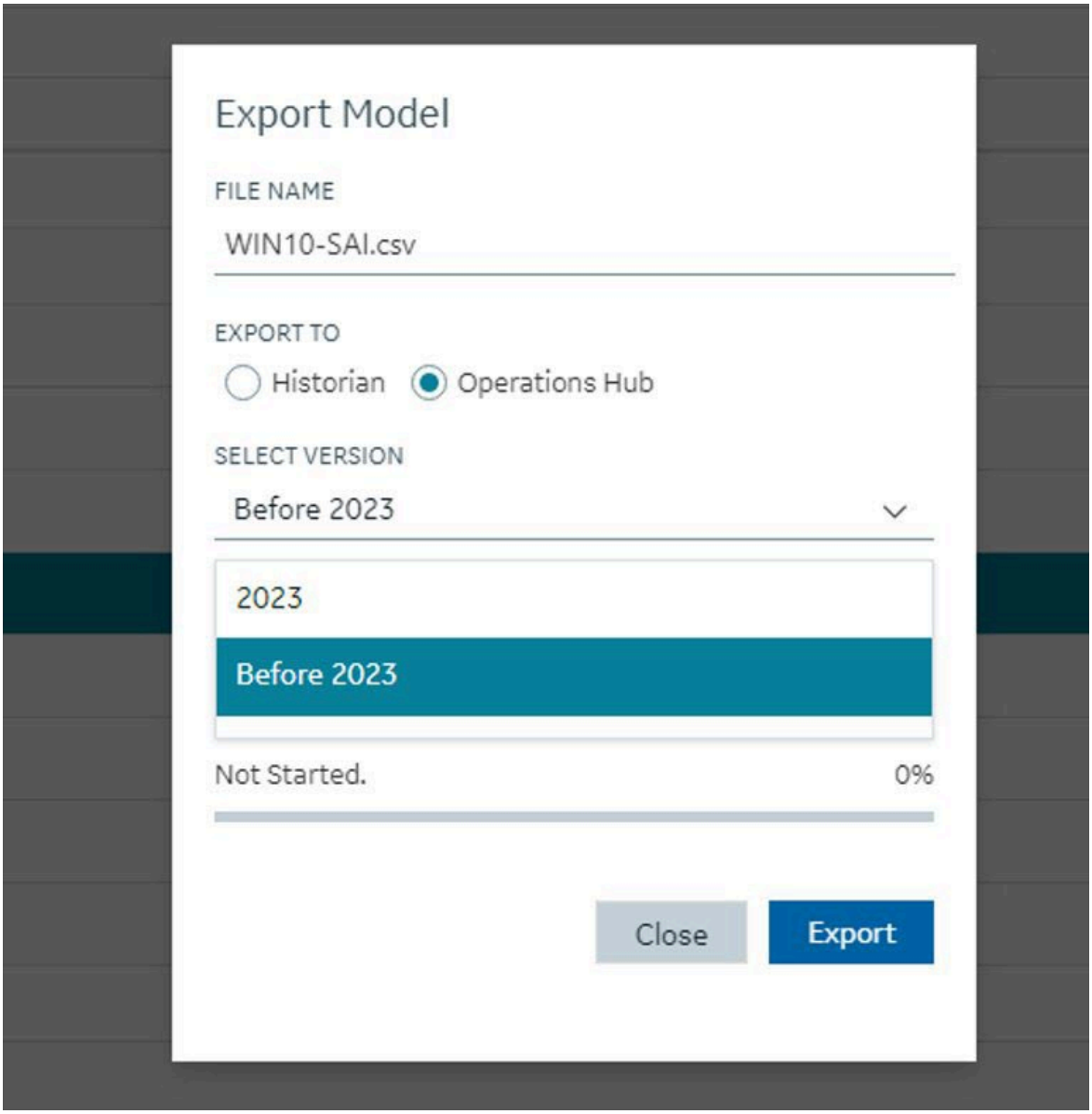


   If you want to export a single object type/instance, under **Object Types** or **Object Instances**, right-click the object type/instance that you want to export (or select ⋯), and then select **Export**.



The **Export Model** window appears. Depending on whether you are exporting all the object types/ instances in the system or just a single one, the **File name** field contains a value in the following format: <*host name*>.csv or <*object type*>.csv or <*object instance*.csv.

4. If needed, modify the value in the **File name** field.
5. Depending on whether you want to export to another Historian system or Operations Hub, select the appropriate option.
6. Operations Hub 2023 supports multi model with multiple roots, you can choose the version while exporting the model either to 2023 or versions prior to 2023.



7. Depending on whether you want to export the templates, the object instances, or both, ensure that the corresponding check boxes are selected. However, you can export templates only to a Historian system, not to Operations Hub.
8. Select **Export**.
   The object types/instances, along with the underlying object variables, are exported in to a .csv file.

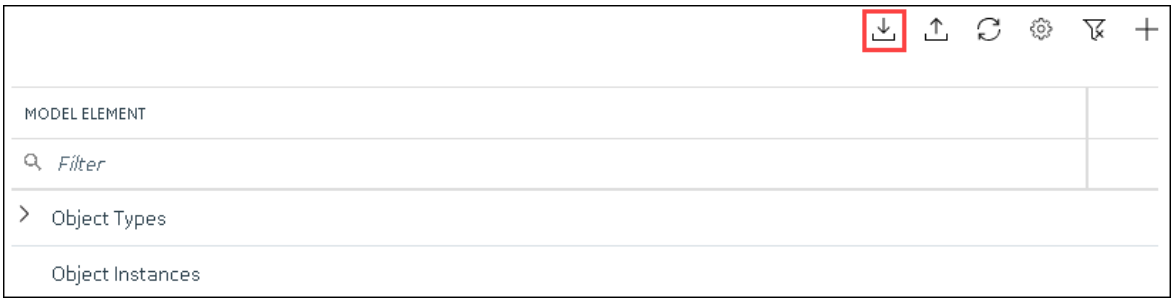
Import an Object Type/Instance

When you create an object type or an object instance, you can use it only in the Historian system in which you have created it. If, however, you want to use the object type/instance in a different Historian system or Operations Hub, you can export it and then import it into the other Historian system or Operations Hub.

You can import each object type/instance separately or all the object types/instances in a Historian system at once.

Important:
If the name of a tag associated with a variable in a model contains a period (.), you cannot import the tag while importing the model into a Historian system.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select , and then select **Browse Model**.
   The **Model** section appears.
3. In the upper-right corner of the main section, select .



   The **Import Model** window appears.
4. Select **Choose File**, and then select the .csv file that contains the object types/instances that you want to import.
5. Depending on whether you want to import the templates, the object instances, or both, ensure that the corresponding check boxes are selected.
6. Select **Import**.
   The object types/instances are imported.

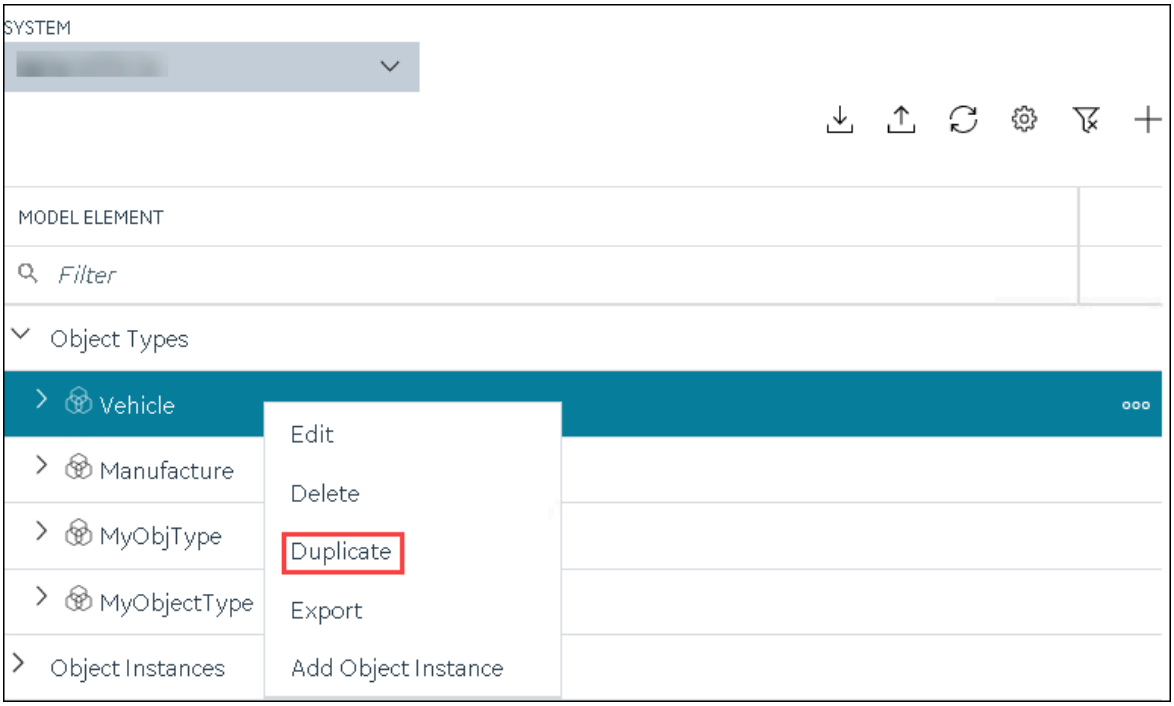
Copy an Object Type

When you create an object type, you also create the default template, custom templates, and variables for each template. For information on each of these template types and variables, refer to About a Historian Model *(on page 1090)* and About Object Templates *(on page 1095)*.

When you copy an object type, all the templates and variables are copied too.

This topic describes how to copy an object type. You can also create one *(on page 1099)*.

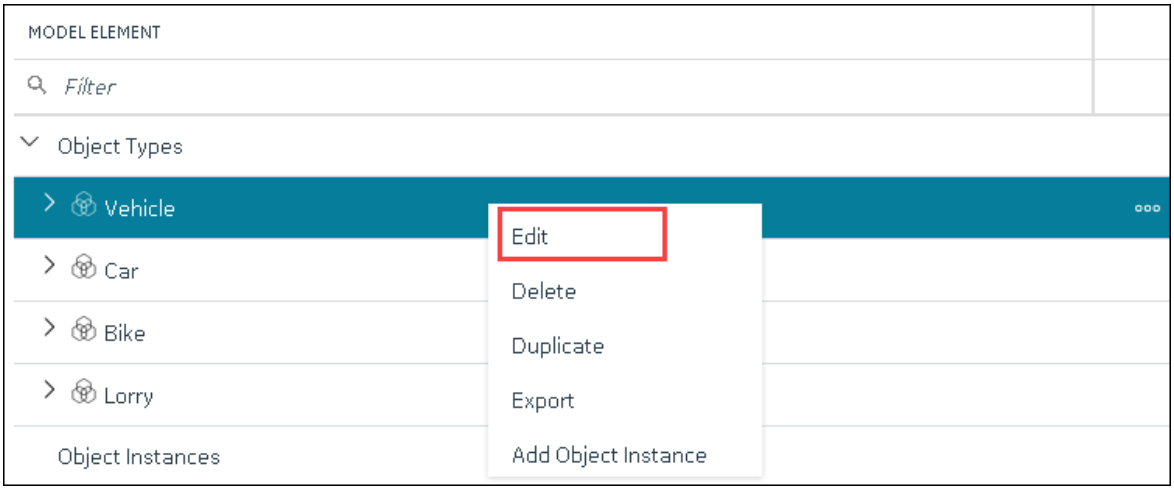
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. Under **Object Types**, select the object type that you want to copy, and then select **Duplicate**.



   The **Duplicate Object Type** window appears.
4. Enter values as described in the following table.

Field	Description
NAME	Enter a name for the object type. A value is required and must be unique. The value that you enter: ◦ Must begin with a letter or a number. ◦ Can contain up to 256 characters. ◦ Can include any of the following special characters: /!|#{}%$-_ ◦ Must not include a space or any of the following characters: ~`+^:;.,?"*=@
DESCRIPTION	Enter a description for the object type.

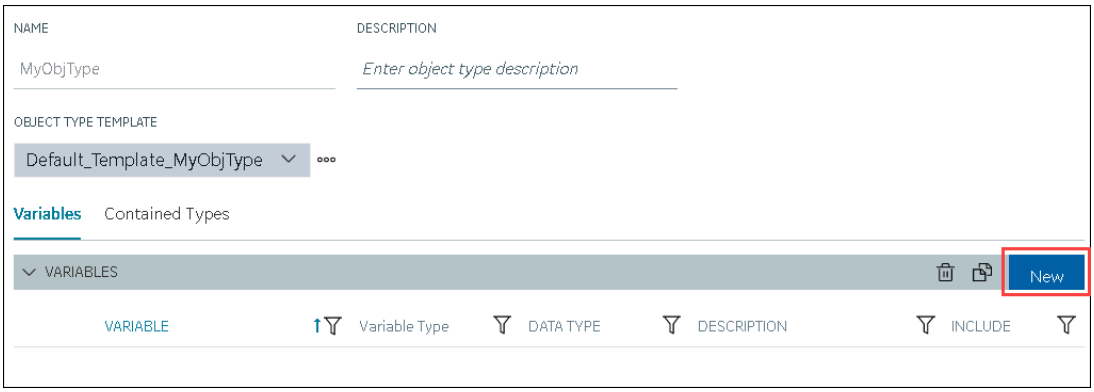
5. Select **Create**.
   The object type is copied, along with the variables and templates in the original object type.
6. Right-click the object type that you have copied (or select ⋯), and then select **Edit**.



   The **<object type name>** section appears. The **OBJECT TYPE TEMPLATE** field contains all the templates in the original object type. In addition, each template contains all the variables as defined in the original object type.
7. To add more variables to a template:

   a. In the **OBJECT TYPE TEMPLATE** field, select the template to which you want to add more variables.

   b. In the **Variables** table, select **New**.



   A blank row appears in the table.

   c. Enter values as described in the following table.

Column	Description
VARIABLES	Enter the name of the variable. It must be unique for the object type.
VARIABLE TYPE	Choose one of the following types of variables: ▪ **Direct:** Tags for these variables are created in Historian when you select a collector instance. ▪ **Indirect:** These variables are mapped with existing Historian tags. ▪ **Static:** These variables have a static value, which you provide when you create an object instance.
DATATYPE	Select the data type of the variable.
DESCRIPTION	Enter a description for the variable.
INCLUDE	Switch the toggle to indicate whether you want to include the variable in the template.

Tip:
If you want to modify a variable, change the values in the aforementioned fields.
If you want to delete a variable, select the check box next to the variable, and then select  .

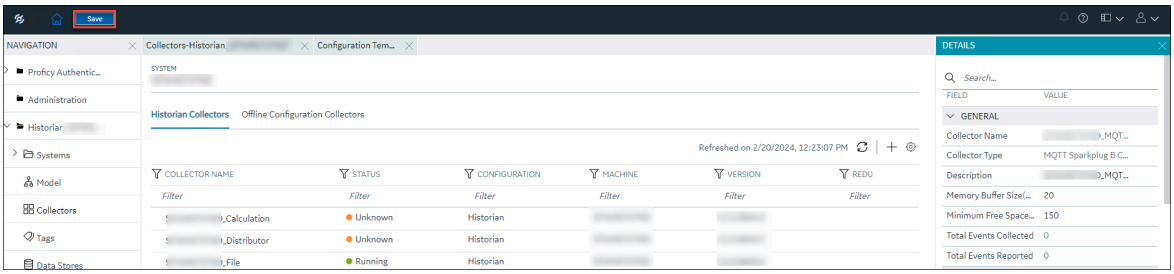
Note:
After you apply a template to an object instance, you cannot modify or delete a variable in the object type; you can only add more variables.

d. Press ENTER.

The default template is modified, and the new variables have been added. You can add more variables or include/exclude variables later too.

> **Note:**
> If you want to create a variable by copying an existing one, select the check box next to the variable that you want to copy, and then select . You can copy only one variable at a time.

8. In the upper-left corner of the page, select **Save**.



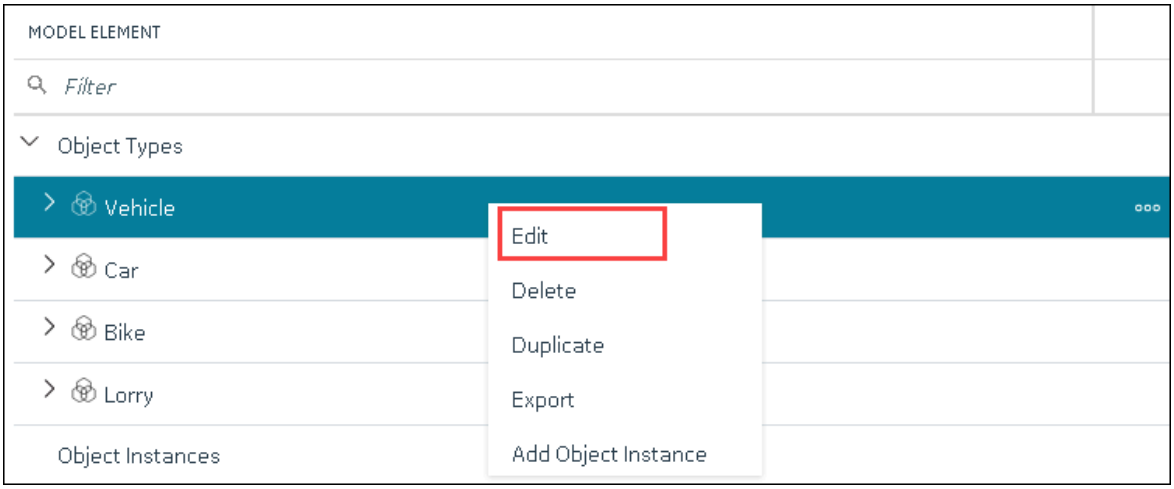
The object type, along with the default template, custom templates, and variables, is created.

Create an object instance *(on page 1107)*.

Delete a Template

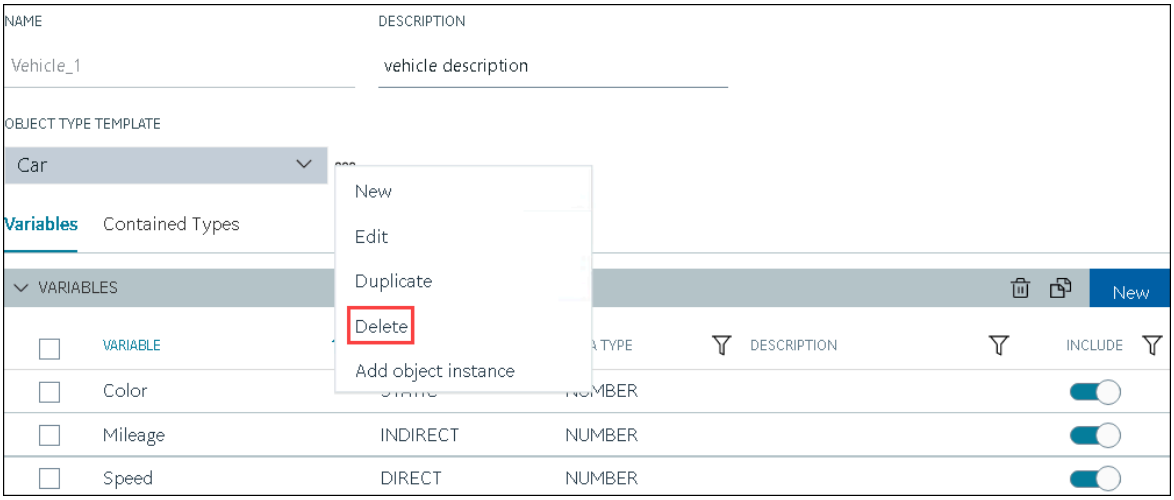
This topic describes how to delete a custom template. You cannot delete a template that is in use (that is, an object instance has been created for the object type). And, you cannot delete the default template in an object type.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select , and then select **Browse Model**.
   The **Model** section appears.
3. In the main section, under **Object Types**, right-click the object type from which you want to delete a template (or select), and then select **Edit**.



The **<object type name>** section appears. The **OBJECT TYPE TEMPLATE** field contains the default template.

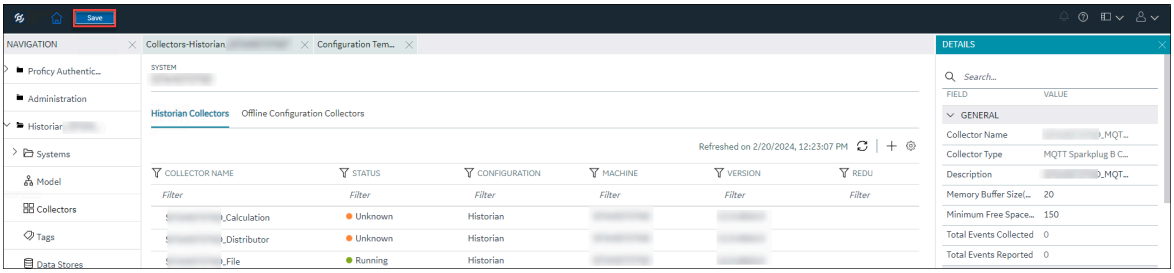
4. In the **OBJECT TYPE TEMAPLTE** field, select the template that you want to delete.
5. Next to the **OBJECT TYPE TEMPLATE** field, select ⋯, and then select **Delete**.



A message appears, asking you to confirm that you want to delete the template.

6. Select **Yes**.

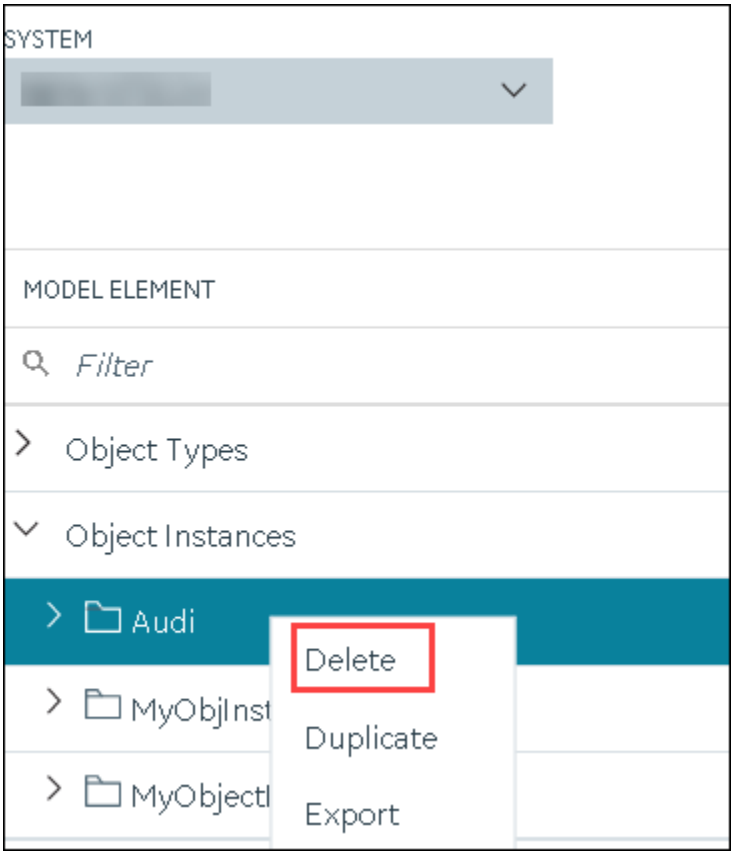
   The template is deleted.
7. In the upper-left corner of the page, select **Save**.



The changes to the object type are saved.

Delete an Object Instance

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. Under **Object Instances**, right-click the object instance that you want to delete (or select ⋯), and then select **Delete**.



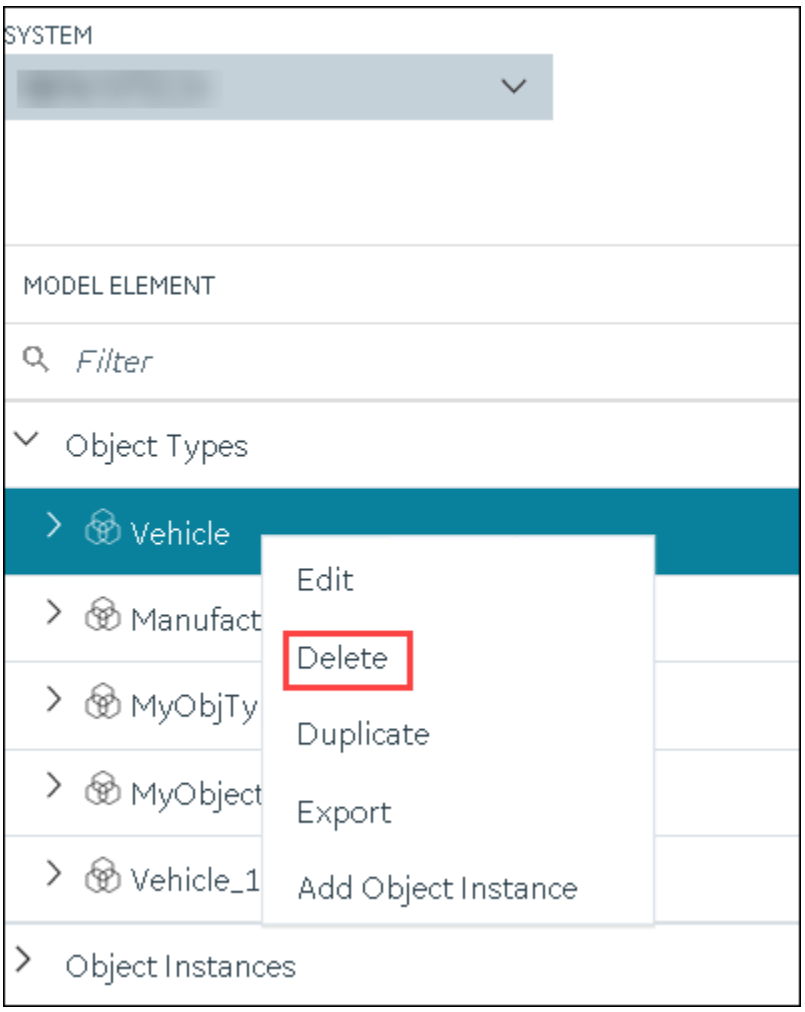
A message appears, asking you to confirm that you want to delete the object instance. If there are direct variables in the object type, you can also choose to delete the tags associated with these variables (along with their data).

4. Select **Yes**.
   The object instance is deleted, along with the underlying variables and templates.

Delete an Object Type

You cannot delete an object type if it is used in an object instance; you must first delete the object instance *(on page 1128)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Model**.
   Alternatively, you can select **Systems**, and then in the row containing the system in which you want to create a model, select ⋯, and then select **Browse Model**.
   The **Model** section appears.
3. Under **Object Types**, right-click the object type that you want to delete (or select ⋯), and then select **Delete**.



A message appears, asking you to confirm that you want to delete the object type.

4. Select **Yes**.
   The object type is deleted, along with the underlying variables and templates in the object type. If, however, the object type is used in an object instance, a message appears, asking you to first delete the object instance.

Managing Historian Systems

Access a System

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system that you want to access.
   The system appears in the main section. The following details of the system appear in the **DETAILS** section.

Table 17. The General Section

Field	Description
Name	The name of the system.
System Type	The type of the system (whether stand-alone or distributed).
Primary Server	The primary server of the system.
Description	The description of the system.
Default System	Indicates whether the system is a default one. If yes, when you log in to Configuration Hub, this system appears by default. The following conditions apply for a default system: ◦ You can have only one default system in Configuration Hub. ◦ You cannot delete a default system. For instructions of setting a default system, refer to Set a Default System *(on page 1164)*.
Collectors	The number of collectors in the system.
Tags	The number of tags in the system.
Data Stores	The number of data stores in the system. **Tip:** If you hover over, the names of the data stores will be displayed.
Clients	The number of clients in the system.
Server Time	The current time of the server.
Server Version	The version of the server.
Demo Mode	Indicates whether the server is currently in demo-license mode.
Clustered	Indicates whether the server is currently in clustered environment.

Table 18. The System Defaults Section

Field	Description
Default Data Store	The default data store in the system. A default data store is the one that is considered if you do not specify a data store while adding a tag. For instructions on setting a data store as default, refer to Set a Default Data Store *(on page 1181)*.
Default Location	The default location in the system. A default location is a server in a system which is considered when you do not specify a location while creating a Data Store. By default, the distributed location on the primary server is the default location. You can, however, set a different default location. To set the default location select .

Table 19. The Alarms and Events Section

Field	Description
Alarms Rate	The rate at which alarm data *(on page 1469)* is collected in the system.

Table 20. The License Section

Field	Description
Historian Tags	The number of tags in the system (out of the total number of licensed tags). **Note:** If this field displays 100 tags and the **Users** field displays 1 client, you are likely running in demonstration mode and may have incorrectly installed your hardware key.
Scada Tags	The number of SCADA tags in the system (out of the total number of licensed SCADA tags).
Users	The number of users in the system (out of the total number of users authorized to access Historian using the software key and license).

Field	Description
	The number of users that are authorized to access Historian is strictly based on the software key and license. However, if you have utilized your available Client Access Licenses (CAL) and need an additional one to use the system in an emergency, you have an option to reserve a CAL. This reserved CAL allows you to access the server. To do so, provide the reserved CAL to the system administrators and add them to the ih Security Admins group. A system administrator can then connect to Historian in an emergency. This facility is optional and does not provide a guaranteed connection. It only eliminates the emergency situations when a CAL is preventing you from accessing the system and may not work if there are other conditions. For example, if the Historian server is busy, you will not be able to connect using this feature.
Data Stores	The number of data stores in the system (out of the total number of licensed data stores).
Calculations	Indicates whether the Calculation collector is licensed on the software key.
Server to Server	Indicates whether the Server-to-Server collector is licensed on the software key.
OPC HDA Server	Indicates whether the OPC Classic HDA server is licensed on the software key.
OPC UA HDA Server	Indicates whether the OPC UA HDA server is licensed on the software key.
Model	Indicates whether the object model is licensed on the software key.
Electronic Signature	Indicates whether electronic signature is licensed on the software key.

Table 21. The Global Security Section

Field	Description
Security Group	Indicates the type of authorization you want to use for the Historian security groups. The following options are available: ◦ **Use Domain**- If you select this option, the system will use the groups specific to this domain for authorization. Only the users and groups that belong to the domain will have specific permissions and access rights. For more information on the security groups, refer to Historian security groups *(on page)*. ◦ **Use Local**- If you select this option, the system will use the groups specific to the local system for authorization. ◦ **Use Proficy Authentication**- If you select this option, the system will use the groups specific to Proficy Authentication (UAA) for authorization. Only the users or groups that belong to the Proficy Authentication will have specific permissions and access rights. For more information on the Proficy Authentication groups, refer to about Proficy Authentication groups *(on page)*. Before you select this option, ensure that you perform the configurations listed in Configurations to use Proficy Authentication Security Groups *(on page)*.
Enforce Strict Client Authentication	If you enable this option, only known user accounts configured on the Data Archiver server computer will be able to access the Historian server.
Enforce Strict Collector Authentication	If you enable this option, only known collector connections configured on the Data Archiver server computer will be able to send data to the Historian server.

For more information on global security, refer to Strict Authentication *(on page)*.

Table 22. The Electronic Signatures/Records Section

Field	Description
Require Point Verification	Indicates whether you must enter identifying information whenever you attempt a restricted action. Whenever you attempt to change the system configuration (for the tag, archive, or collector), a tag value, or another record, you must electronically sign the action with a username and password. If the user is authorized to make this change, the identity of the person, the action performed, and the time it was performed, are all recorded in the audit trail. **Note:** ◦ The audit features are not dependent on this feature being enabled. Historian audits all user actions regardless of whether this option is enabled. Enabling electronic signatures and electronic records also requires you to reverify your identity when you use the Historian Excel Add-in, modify or create a tag, or import data or messages. **Note:**This feature is available only if you have purchased the Electronic Signatures and Electronic Records option.
Verification Message	When point verification is enabled, whenever you attempt to perform an action specified as requiring point verification, you are prompted to authenticate. ◦ **USERNAME**: This is populated with the user that is logged in to Configuration Hub and disabled. ◦ **PASSWORD**: The logged in user's password. ◦ **DOMAIN**: The logged in user's domain.

3. Expand the system in the main section.
   A list of servers in the system appears, displaying the following information.

Field	Description
MACHINE NAME	In a stand-alone Historian system, this column displays the host name of the Historian server. In a horizontally scalable Historian system, this column displays the host name of the primary server.
STATUS	The current status of the Historian system.
ARCHIVE COMPRESSION	The current effect of archive data compression. At the system level, this value is calculated as the average of the corresponding values of individual servers in the system. If the value is zero, it indicates that archive compression is either ineffective or turned off. To increase the effect of data compression, increase the value of archive compression deadbands on individual tags in the **Tags** section to activate compression. In calculating the effect of archive compression, Historian counts internal system tags as well as data source tags. Therefore, when working with a very small number of tags and with compression disabled on data source tags, this field may indicate a value other than zero. If you use a realistic number of tags, however, system tags will constitute a very small percentage of total tags and will therefore not cause a significant error in calculating the effect of archive compression on the total system.
WRITE CACHE HIT RATIO	The hit ratio of the write cache in percentage of total writes. At the system level, this value is calculated as the average of the corresponding values of individual servers in the system. It is a measure of how efficiently the system is collecting data. Typically, this value should range from 95 to 99.99%. If the data is changing rapidly over a wide range, however, the hit percentage drops significantly because current values differ from recently cached values. More regular sampling may increase the hit percentage. Out-of-order data also reduces the hit ratio.

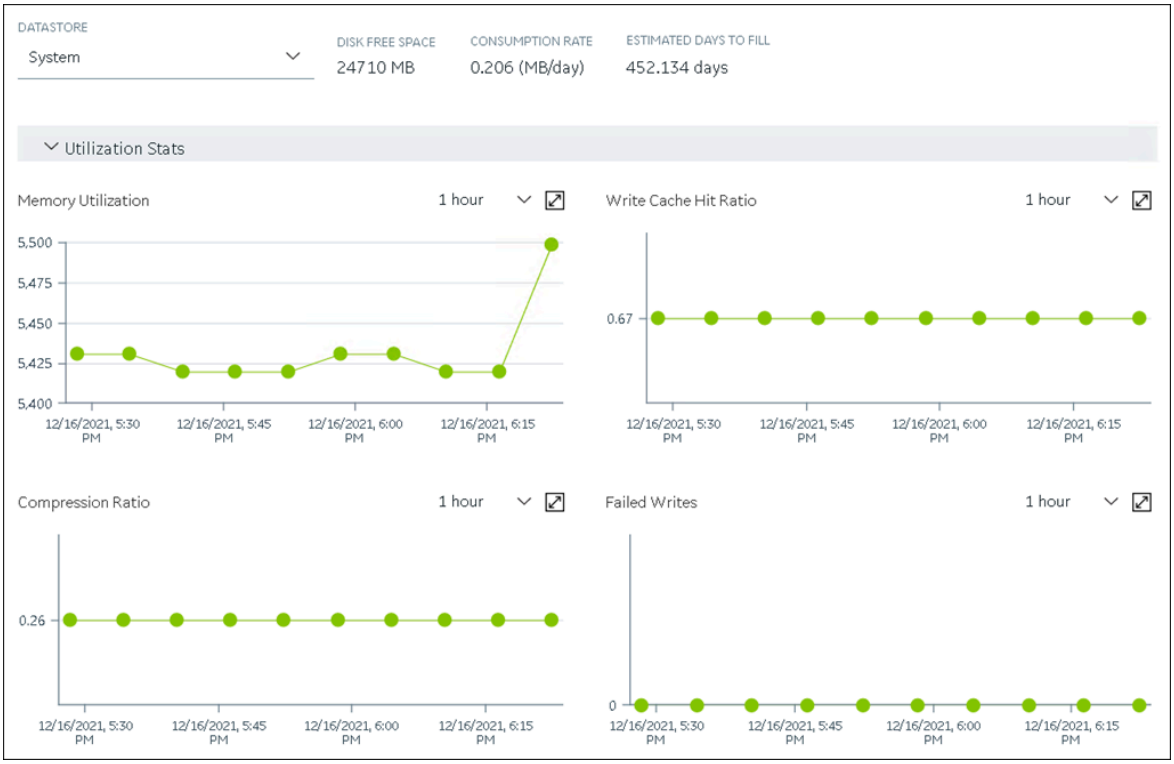
Field	Description
CONSUMPTION RATE	The rate at which the archive disk space is consumed. At the system level, this value is calculated as the sum of the corresponding values of individual servers in the system. If the value is too high, you can reduce it by slowing the poll rate on selected tags or data points or by increasing the filtering on the data (widening the compression deadband to increase compression).
READ THREAD USAGE	The percentage of the read threads currently in use by the system. At the system level, this value is calculated as the average of the corresponding values of individual servers in the system.
WRITE THREAD USAGE	The percentage of the write threads currently in use by the system. At the system level, this value is calculated as the average of the corresponding values of individual servers in the system.
OUT OF ORDER WRITE RATE	The number of out-of-order events per minute. At the system level, this value is calculated as the sum of the corresponding values of individual servers in the system.
MIN DISK SPACE LEFT	The minimum free disk space in MB that must be available on the computer. If the minimum space required is not available when the collector starts, the collector will shut down.
FAILED WRITE RATE (EVENTS/MIN)	The number of samples that failed to be written per minute. At the system level, this value is calculated as the sum of the corresponding values of individual servers in the system. Since failed samples are a measure of system malfunctions or an indication of offline archive problems, this value should be zero. If you observe a non-zero value, investigate the cause of the problem and take corrective action. Historian also generates a message if a writing a sample fails. Note that the message only appears once per tag, for a succession of failed writes associated with that tag. For example, if the number displayed in this field is 20, but they all pertain to one Historian tag, you will only receive one message until that Historian tag is functional again.

Field	Description
MEMORY USAGE	Indicates how much server memory is being consumed.
READ QUEUE RATE (40 MSG/ MIN)	The number of read requests processed per minute, that came into the archiver from all clients.
WRITE QUEUE RATE (MSG/ MIN)	The number of write requests processed per minute, that came into the archiver from all clients.
MESSAGE QUEUE RATE (MSG/ MIN)	The number of messages processed per minute.
READ QUEUE SIZE (EVENTS)	The total number of messages present in the Read queue.
WRITE QUEUE SIZE (EVENTS)	The total number of messages present in the Write queue.
MESSAGE QUEUE SIZE (MSG)	The total number of messages present in the Message queue.

Tip:
You can show/hide/reorder columns in the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

4. To access the system performance, right-click the system (or select ⋯), and then select **View Server Performance**.

The **<system name> - Performance** section appears, displaying graphs for some of the metrics described in the previous table.



Access the Collectors in a System

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system whose collectors you want to access.
   The system appears in the main section.
3. Right-click the system whose collectors you want to access (or select ⋯), and then select **Browse Collectors**.
   This displays the list of Historian collectors and Offline configuration collectors. By default, the Historian collector instances added to the system appear, displaying the following information.

Column	Description
COLLECTOR NAME	The name of the collector instance. If you select the link in this column, the details of the collector instance appears.
STATUS	The status of the collector. Contains one of the following values:

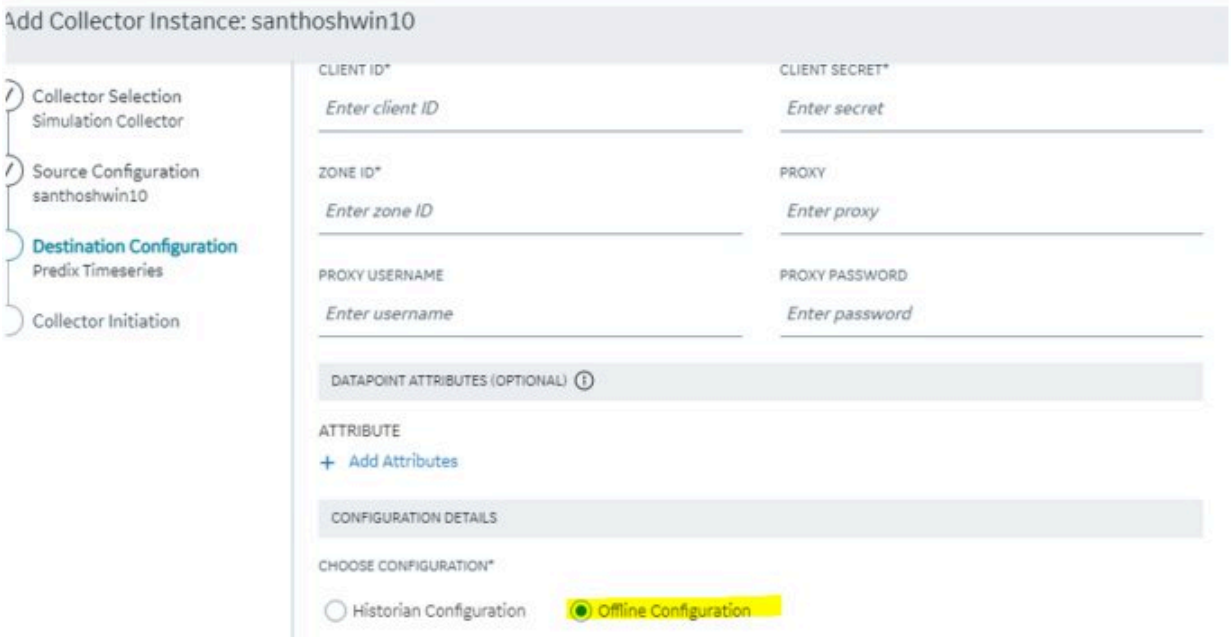
Column	Description
	◦ **Started** ◦ **Stopped** ◦ **Running** ◦ **Paused** ◦ **Unknown**
CONFIGURATION	The source of the tag configuration for the collector. Contains one of the following values: ◦ **HISTORIAN**: Indicates that tags are configured using Historian Administrator. ◦ **OFFLINE**: Indicates that tags are configured using an offline configuration *(on page)* file.
MACHINE	The name of the machine on which the collector is installed.
VERSION	The version number of the collector.
REDUNDANCY	Indicates whether collector redundancy is enabled, which decreases the likelihood of lost data due to software or hardware failures. For more information, refer to About Collector Redundancy *(on page)*.
REPORT RATE	The average rate at which the collector is sending data. This is a general indicator of load on the collector.
OVERRUNS	The total number of data events not collected. In normal operation and under normal conditions, this value should always be zero. If the value is not zero, which indicates that data is being lost, you must take steps to reduce peak load on the system by increasing the collection interval.
COMPRESSION	The effectiveness of collector compression. If the value is low, you can increase the compression deadbands to pass fewer values and thus increase the effect of compression.
OUT OF ORDER	The total number of out-of-order samples for the collector.
TAG COUNT	The number of tags for which the collector collects data.
COMMENTS	The comments that you have entered for the collector.

Tip:

- To access the details of a collector, select the row containing the collector instance. The details appear in the **DETAILS** section.
- You can show/hide/reorder columns in the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

Access Offline Configuration Collectors

Offline Configuration Collectors are the instances of collectors whose destination is the cloud and display the configuration details as Offline Configuration.



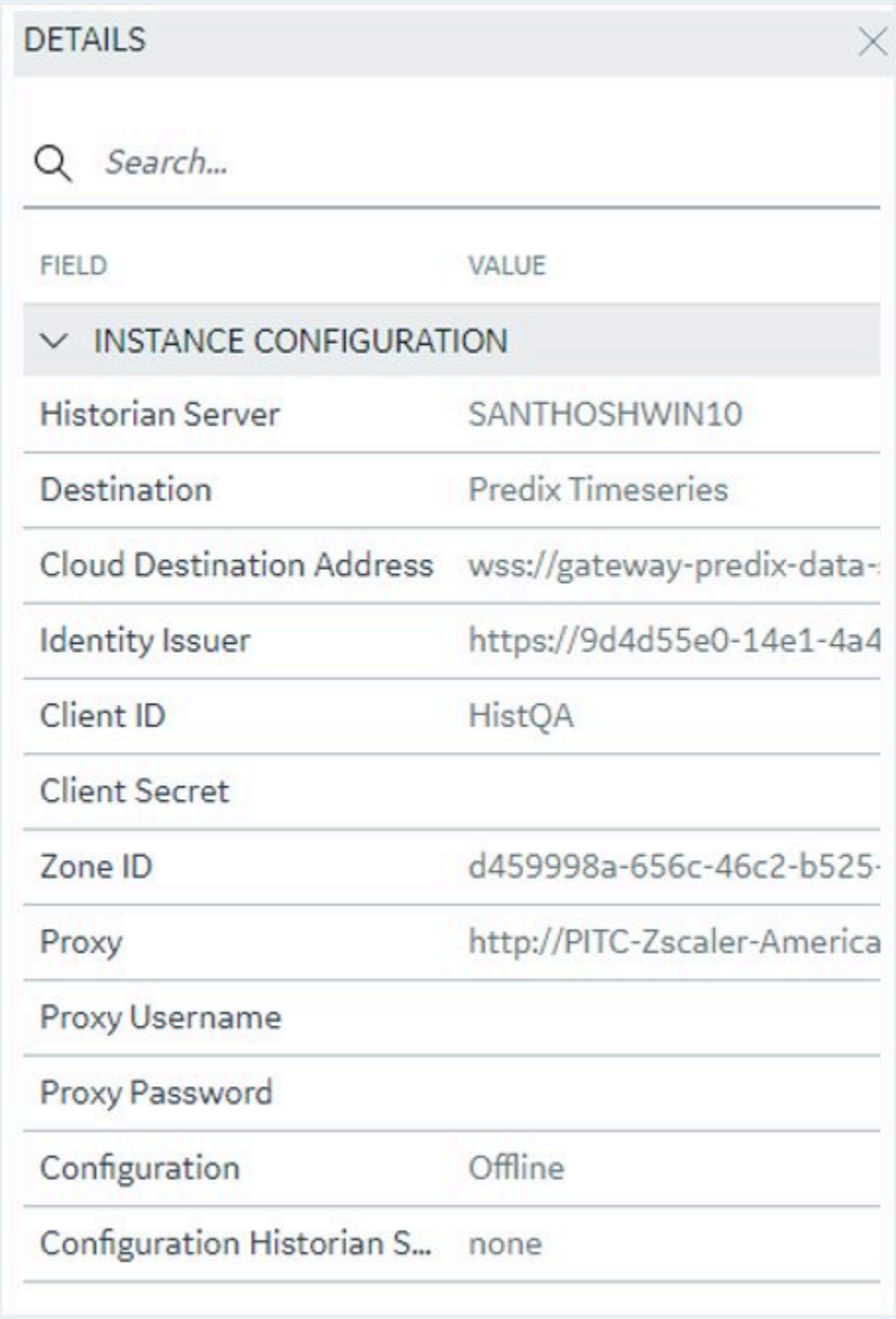
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system whose collectors you want to access.
   The system appears in the main section.
3. Right-click the system whose collectors you want to access (or select ⋯), and then select **Browse Collectors**.
   This displays the list of Historian collectors and Offline configuration collectors. By default, the Historian collector instances added to the system appear, displaying the following information.

Tip:

- To access the details of a collector, select the row containing the collector instance. The details appear in the **DETAILS** section.
- You can show/hide/reorder columns in the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

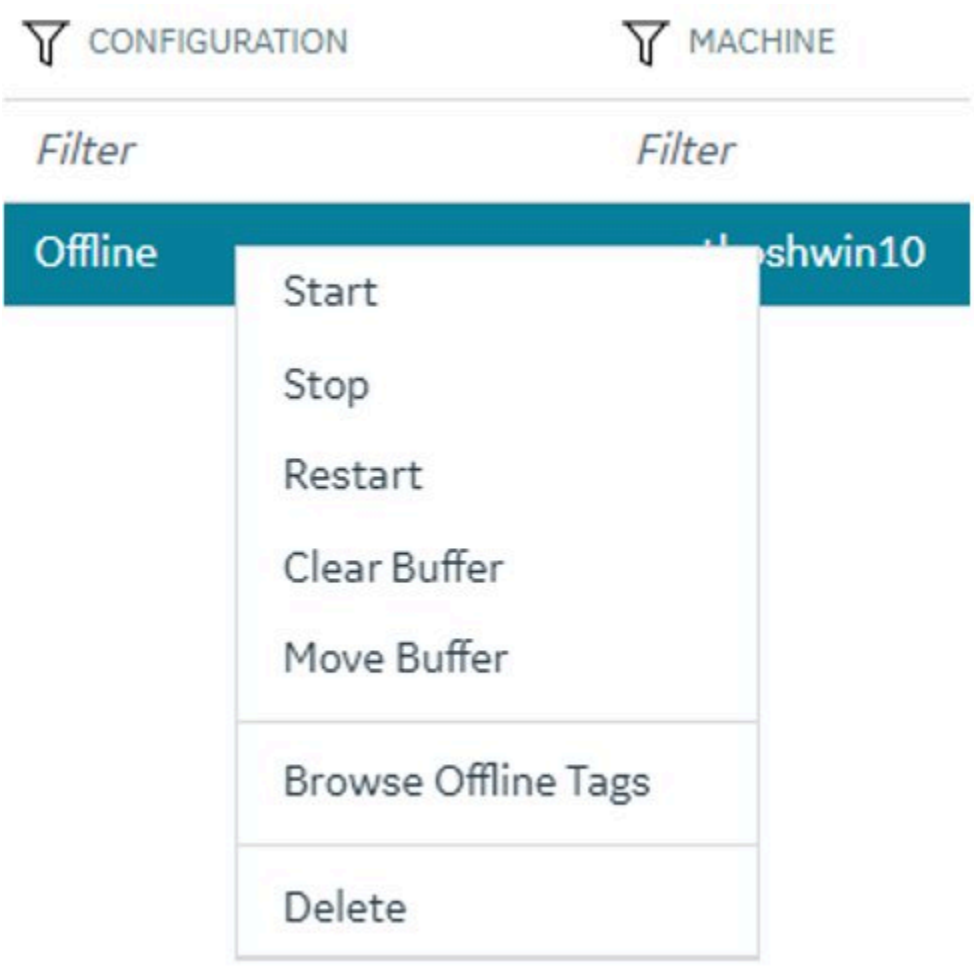
The Details panel for the Offline Configuration Collector Interface contains information regarding the instance configuration provided for the destination while installing software

like Predix, MQTT, or Azure. For example, here is an example of the Details panel for the Offline Configuration Collector:



Manage Offline Configuration Collectors

Like other Historian collectors, Offline Configuration collectors can also be managed by selecting different options:



Refer to the following sections on how to use these options:

- Start a Collector *(on page 1356)*
- Stop a Collector *(on page 1357)*
- Restart a Collector *(on page 1358)*
- Delete the Buffer Files of a Collector *(on page 1362)*
- Move the Buffer Files of the Collector *(on page 1363)*
- Delete a Collector Instance *(on page 1373)*

Access the Tags in a System

This topic describes how to access all the tags in a system, regardless of whether they are added to a collector instance. You can also access all the tags added to a collector instance *(on page 1350)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system whose tags you want to access.
3. Right-click the system whose tags you want to access (or select ⋯), and then select **Browse Tags**.
   The tags added to the system appears, displaying the following information.

Column	Description
TAG NAME	The name of the tag.
DESCRIPTION	The description of the tag.
COLLECTOR NAME	The name of the collector instance to which you have added the tag.
LAST 10 VALUES	The last 10 values collected for the tag, plotted as a trend chart. If you pause over the chart, the minimum, maximum, first, and last values among the 10 values appear.
DATA COLLECTION	Indicates the status of the data collection.
TAG ALIAS	Indicates whether the tag contains aliases, which are created when you rename the tag using an alias *(on page 1417)*.

> **Tip:**
> You can show/hide/reorder columns in the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

4. To narrow down your search results:
   You can enter a name or a value partially or use the wildcard character asterisk (*).
   a. Select **Search**.
   b. Enter the search criteria, and then select **Apply**. You can add more search criteria by selecting **Add Attribute**.

The list of tags are filtered based on the search criteria. The search criteria that you have provided appear at the top of the page. You can remove any of the criteria as needed.

Tip:
To access the details of a tag, select the row containing the tag. The details appear in the **DETAILS** section.

Add a System

Install Historian on the machine that you want to add. If you want to create a stand-alone system, install single-server Historian *(on page 1024)*. If you want to create a horizontally scalable system, install Historian primary server *(on page 1024)*.

If you want to manage a Historian system using Configuration Hub, you must add it to Configuration Hub.

When you access Configuration Hub for the first time, a default Historian system is available. In a distributed environment, the primary server of this system is the machine whose Configuration Hub details you enter while installing Web-based Clients. This topic describes how to add another system.

Note:
Adding a Historian system is specific to the logged-in user.

1. Access Configuration Hub *(on page 1055)*
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appears in the main section.
3. Select +.
   The **Add System** window appears.
4. Provide values as specified in the following table.

Field	Description
SYSTEM NAME	Enter a name for the Historian system. This name must be unique for a user.
HISTORIAN SERVER	Enter the host name or the IP address of the system that you want to add. This name must be unique for a user.
DESCRIPTION	Enter a description for the system.

Field	Description
Set as Default System	Select this check box if you want to set this system as the default one. If you do so, when you access Configuration Hub, this system appears by default. The default system varies with the user.

5. Select **Add**.
   The Historian system is added, and it appears in the **Navigation** section.

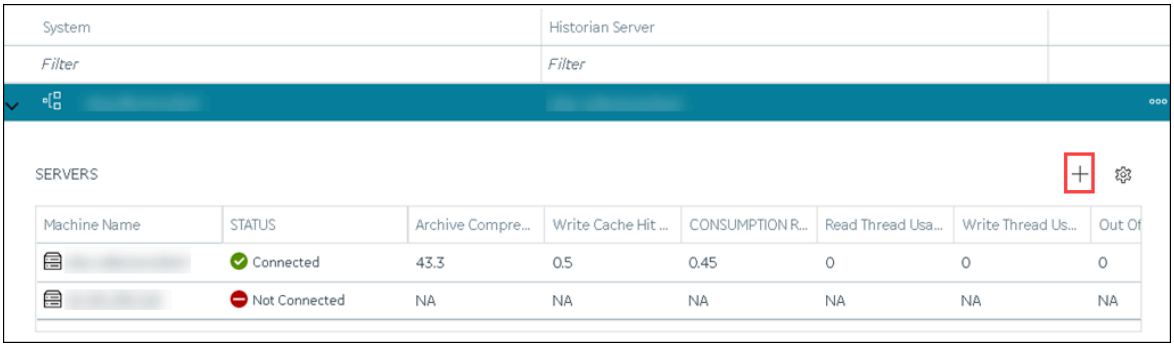
- As needed, add another data store *(on page 1089)*.
- If you want to create a horizontally scalable system, the machine that you have added serves as the primary server. On the machines that you want to use as distributed servers, you must install Historian distributed nodes *(on page 1024)* and then add them to the system *(on page 1080)*.

Add a Distributed/Mirror Server

1. Install Historian server *(on page 1024)* on the machine that you want to add as a distributed server.
2. Add a system *(on page 1146)*. The server that you specify while adding the system serves as the primary server for the system.

If you want to create a horizontally scalable Historian system, you must first add a primary server, and then add one or more distributed/mirror machines to scale out the primary server horizontally and thus, improve performance.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appears in the main section.
3. Expand the system in which you want to add a distributed/mirror server.
   A list of servers in the system appears.
4. Select +.



The **Add Server Machine: <system name>** window appears.

5. Enter the host name or IP address of the machine that you want to add, and then select **Add**. The distributed server is added to the system. A distributed location is added in the server. You cannot modify or delete this location.

- If you want high availability of one or more data stores in the server, create a mirror location *(on page 1087)*, and then add the data stores *(on page 1089)*. If not, add the data store *(on page 1089)* to the distributed location.
- If you want to set a distributed node as backup to the primary node, set a distributed node as backup *(on page 1084)*.

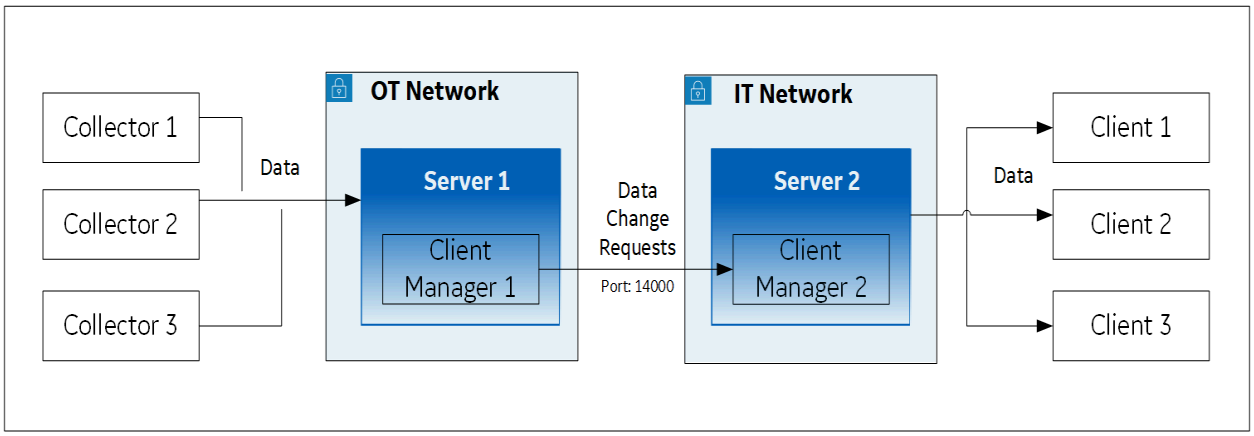
Set Up a Mirror of Mirror

1. Install Historian server *(on page 1024)* on each machine that you want to use in the mirror of mirror setup.
2. Set up Configuration Hub *(on page 1023)* on each machine that you want to use in the mirror of mirror setup.
3. Add a system *(on page 1146)*. The server that you specify while adding the system serves as the primary server for the system.
4. Create data stores *(on page 1089)* in the primary server in the public/IT network with the same name as the data stores in the primary server in your organization network.

You can set up a mirror of the Historian server in a network different from that of your organization. When you do so, any tag/data update requests to the Historian server can be routed to the public and IT network instead of your organization's network.

Note:
For the Historian Enterprise Mirror Architecture, only "Time based" archives are supported.

Single-Node Setup: The following image shows two networks - OT and IT - with a Historian server installed in each network. These networks communicate using port 14000.



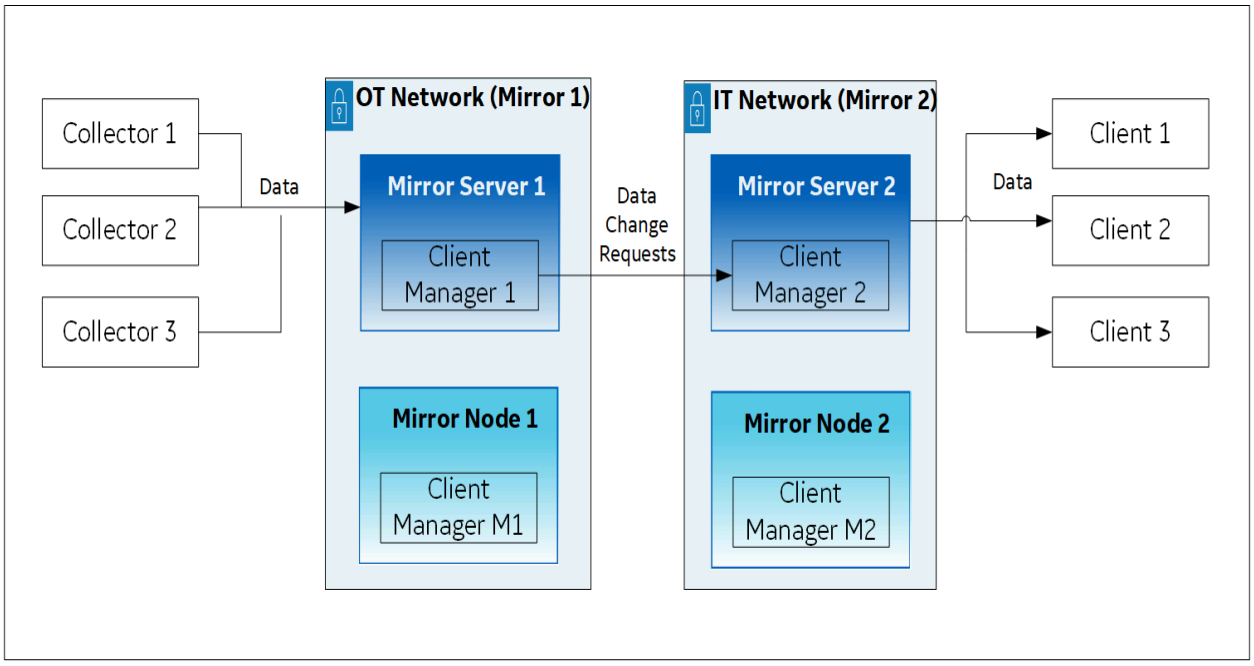
In this setup:

1. Server 1 is the primary server in the OT network; it stores data from collectors.
2. Server 2 is the primary server in the IT network; it is connected to clients.
3. When a tag/data is created, updated, or deleted, Client Manager 1 communicates the same with Client Manager 2 (installed with Server 2 in the IT network).
4. The change in the tag/data is replicated in Server 2 (that is, data is created, updated, or deleted accordingly).
5. The latest data is retrieved from Server 2 using the clients.

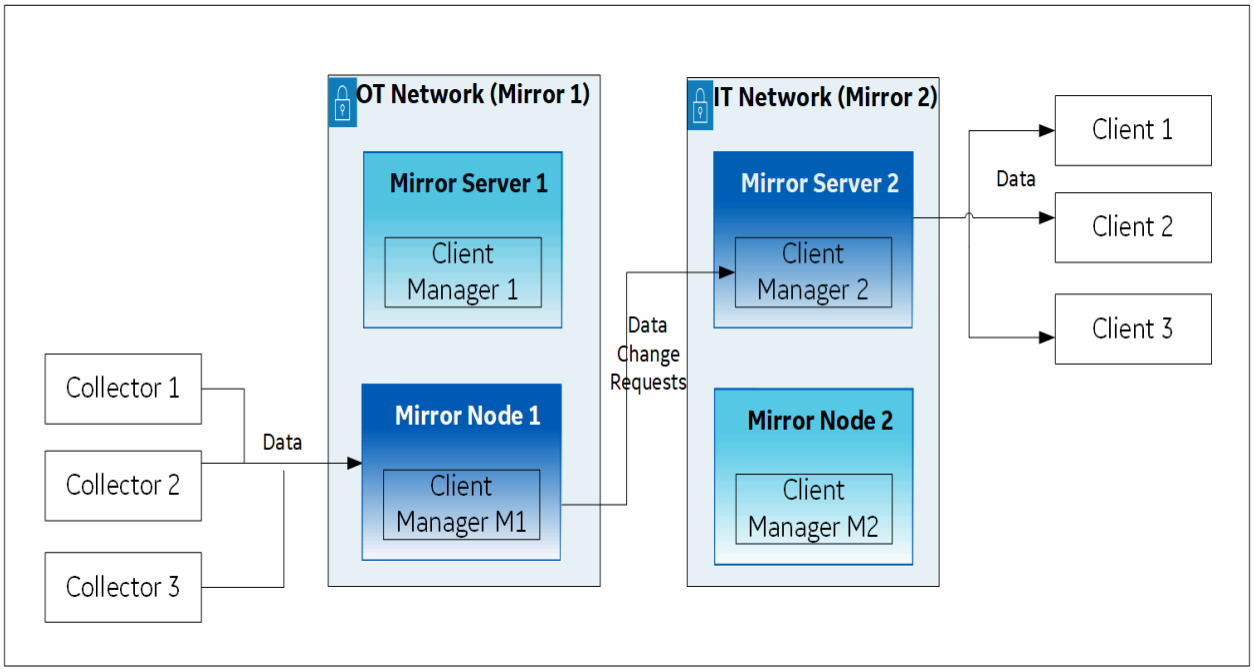
Mirror Setup: The following image shows two mirrors:

- Mirror 1 includes Mirror Server 1 and Mirror Node 1, which is a backup/standby node for Mirror Server 1; both these machines are in the OT network.
- Mirror 2 includes Mirror Server 2 and Mirror Node 2, which is a backup/standby node for Mirror Server 2; both these machines are in the IT network.

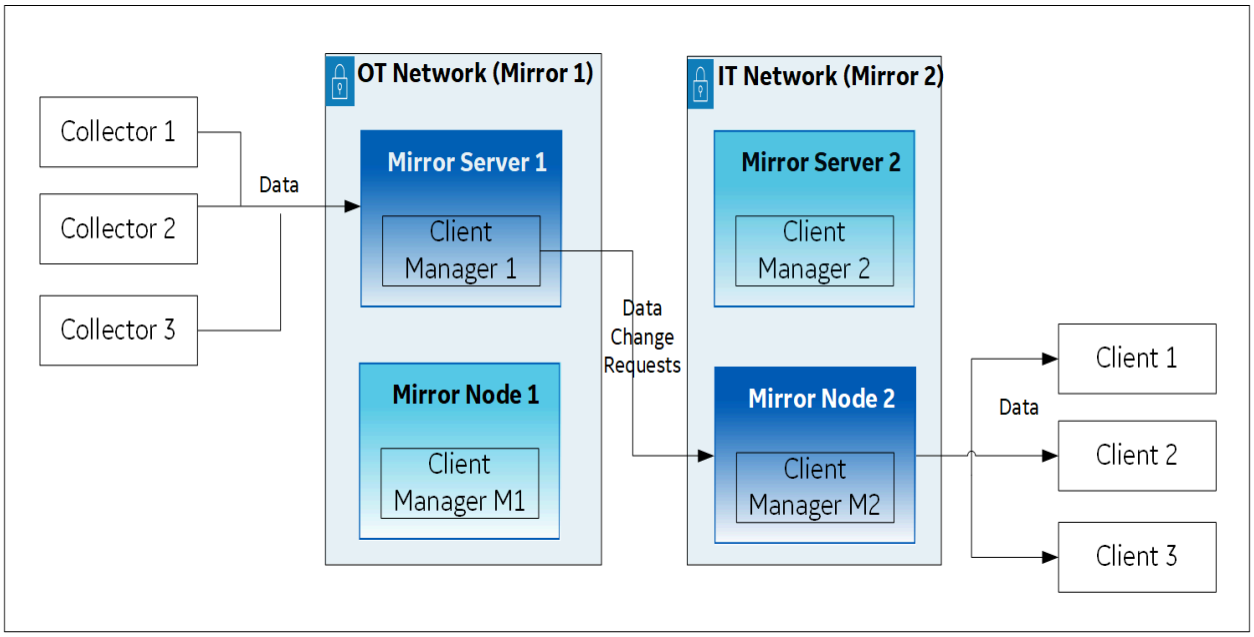
Client Manager 1 in Mirror Server 1 communicates with Client Manager 2 in Mirror Server 2.



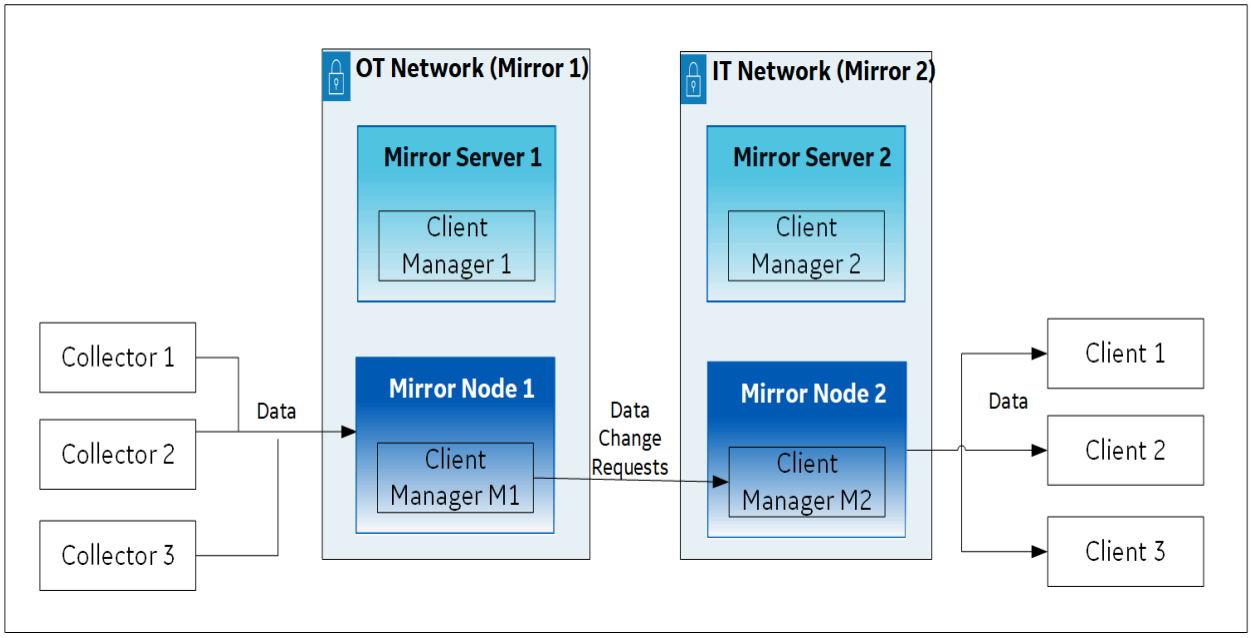
If Mirror Server 1 goes down, Client Manager M1 in Mirror Node 1 communicates with Client Manager 2 in Mirror Server 2.



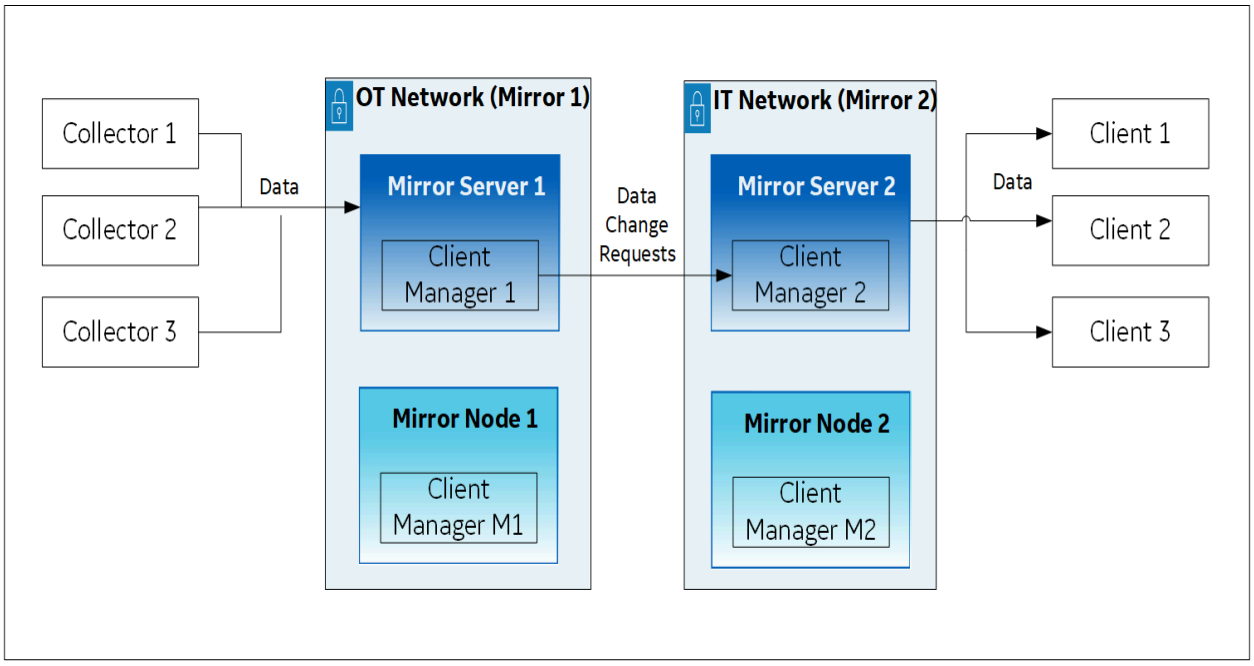
Similarly, if Mirror Server 2 goes down, Client Manager 1 in Mirror Server 1 communicates with Client Manager M2 in Mirror Node 2.



If both Mirror Server 1 and Mirror Server 2 are down, Client Managers M1 and M2 communicate with each other.



If Mirror Server 1 and/or Mirror Server 2 are available, the connection is re-established using these primary servers.



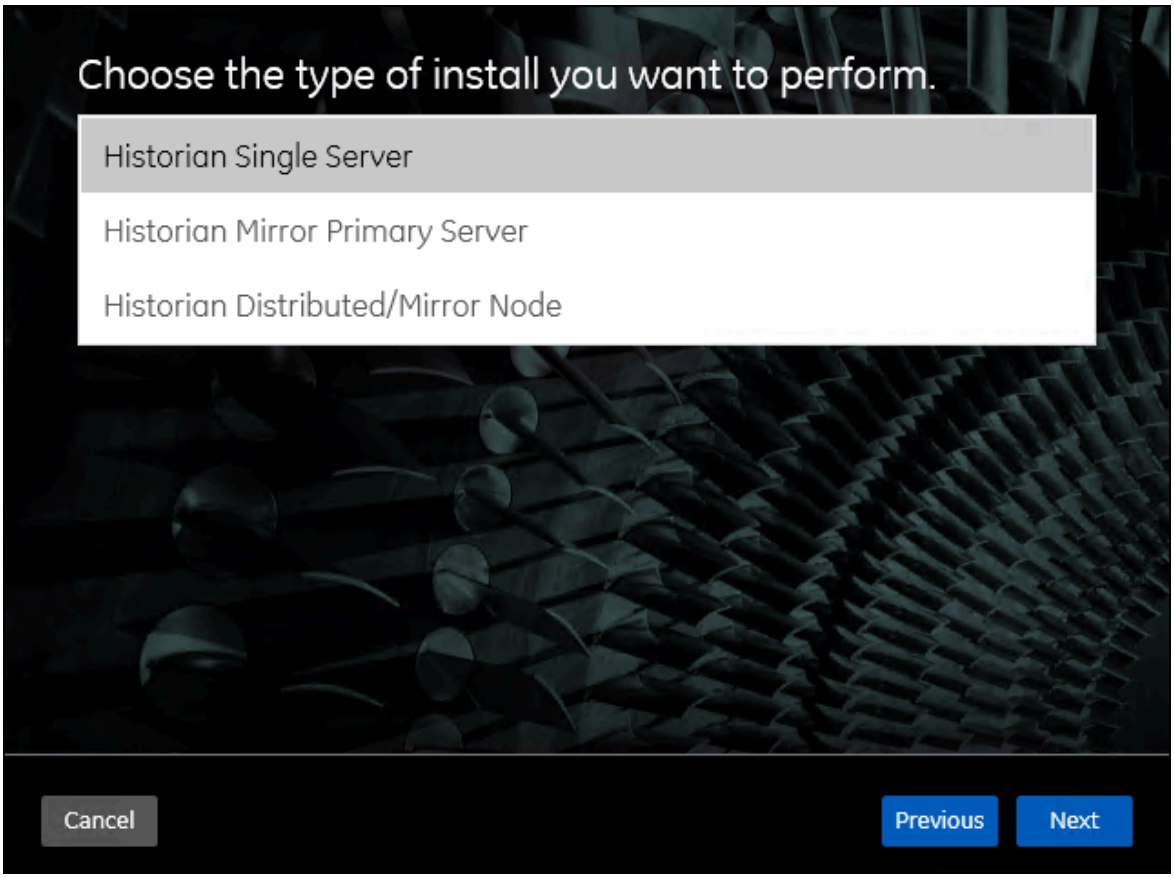
Thus, you can choose to always retrieve data from either Mirror Server 2 or Mirror Node 2. In addition, the store-and-forward functionality is available (in case Client Managers are not yet connected).

This topic describes how to set up a mirror of mirror for the configuration described in the preceding example. It includes the following high-level steps:

1. Installing the Historian server on all the machines
2. Setting up mirror 1
3. Setting up mirror 2
4. Setting up a mirror of mirror

Installing the Historian server

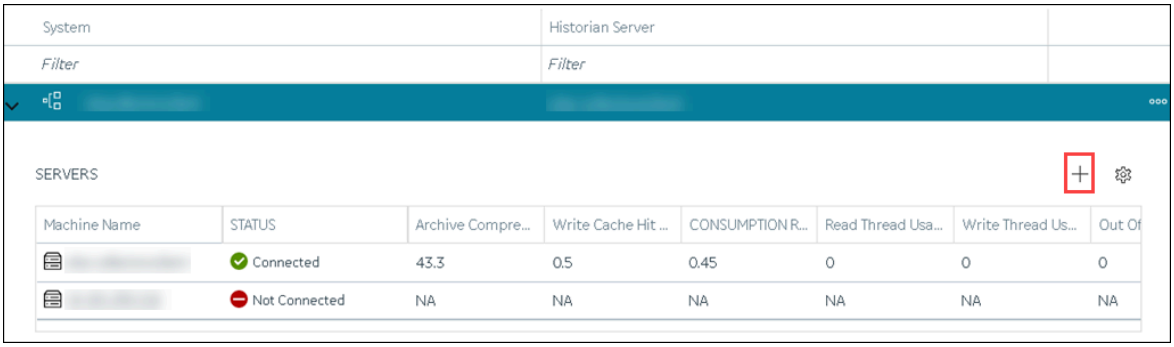
1. On the machines designated as the mirror primary servers (Mirror Server 1 and Mirror Server 2 in the example), install the Historian server *(on page 1024)*. During the installation, select **Historian Mirror Primary Server** on the **Choose the type of install you want to perform** page.



2. On the machines designated as mirror nodes (Mirror Node 1 and Mirror Node 2 in the example), install the Historian server *(on page 1024)*. During the installation, select **Historian Distributed/ Mirror Node** on the **Choose the type of install you want to perform** page.

Set up Mirror 1:

3. On the mirror primary server in your organization's network (Mirror Server 1 in the example), access Configuration Hub *(on page 1055)*.
4. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appears in the main section.
5. Expand Mirror Server 1.
   A list of servers in the system appears.
6. Select +.

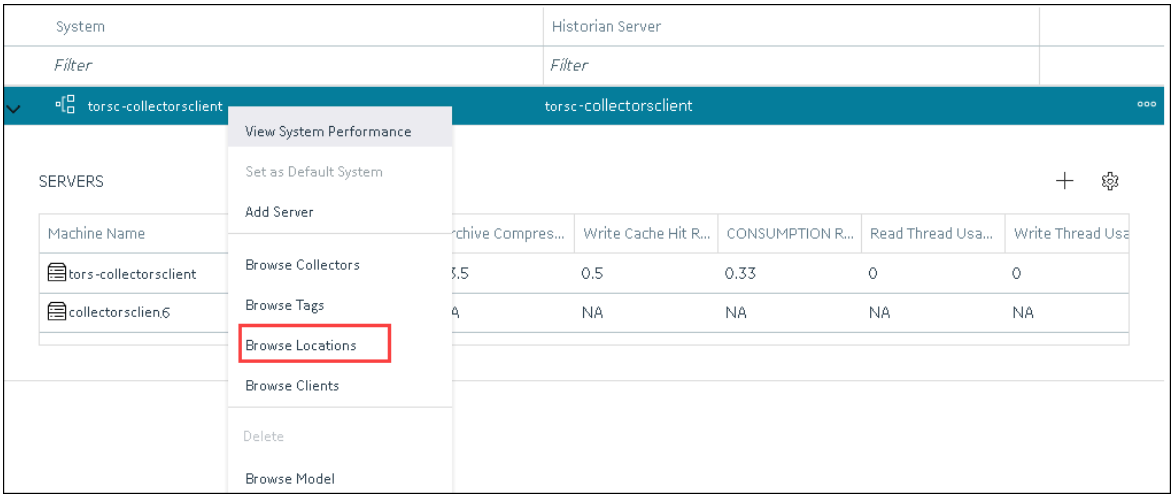


The **Add Server Machine: <system name>** window appears.

7. Enter the host name or IP address of the mirror node in your organization's network (Mirror Node 1 in the example), and then select **Add**.

   The distributed server is added to the system. A distributed location is added in the server.

8. Right-click Mirror Node 1, and then select **Browse Locations**.



A list of distributed locations in the system appears.

9. Select **Mirror Locations**.

   A list of mirror locations in the system appears.

10. In the upper-right corner of the main section, select +.

    The **Add Mirror Location** window appears.

11. Provide values as described in the following table.

Field	Description
MIRROR LOCATION NAME	Enter a name for the mirror location. A value is required and must be unique for the system.

Field	Description
SERVER MACHINES	Select the servers that you want to add to the mirror group (Mirror Server 1 and Mirror Node 1 in this example). This box contains a list of all the servers in the system. You must add minimum two servers to a mirror location.

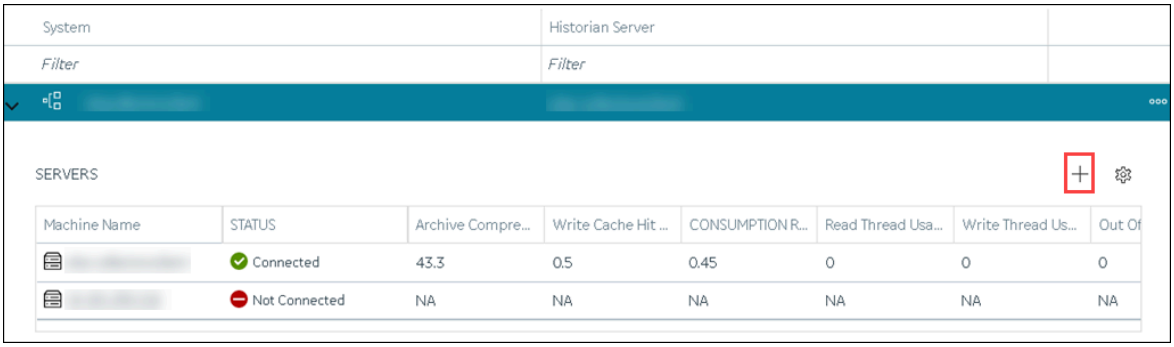
12. Select **Add**.
    Mirror Node 1 is created.
13. Right-click the system name, and then select **Add Data Store**.
    The **Add Data Store: Mirror Node 1** window appears.
14. Enter values as described in the following table.

Field	Description
DATA STORE NAME	Enter a unique name for the data store. A value is required. You can use all alphanumeric characters and special characters except / \ * ? < > | You must provide the same name for the mirror setup in the IT network (mirror 2 in the example).
DESCRIPTION	Enter a description for the data store.
Set as default data store for the system	Select this check box if you want to set this data store as the default one. A default data store is the one that is considered if you do not specify a data store while adding a tag. You can set only one data store as default.

15. Select **Add**.
    Mirror 1 is configured.

Set up Mirror 2:

16. On the mirror primary server in the IT network (Mirror Server 2 in the example), access Configuration Hub *(on page 1055)*.
17. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
    A list of systems appears in the main section.
18. Expand Mirror Server 2.
    A list of servers in the system appears.
19. Select +.

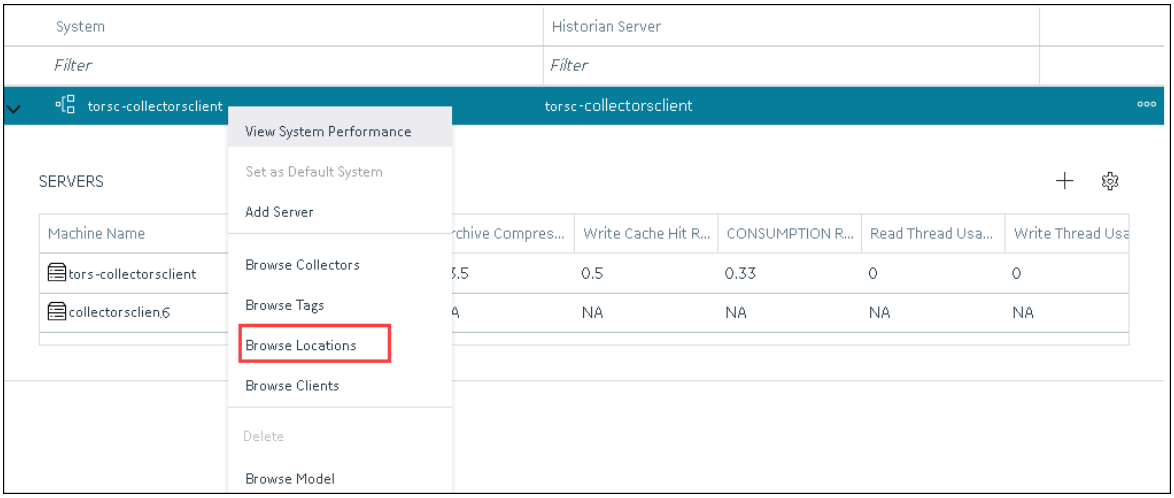


The **Add Server Machine: <system name>** window appears.

20. Enter the host name or IP address of the mirror node in your organization's network (Mirror Node 2 in the example), and then select **Add**.

    The distributed server is added to the system. A distributed location is added in the server.

21. Right-click the system name, and then select **Browse Locations**.



A list of distributed locations in the system appears.

22. Select **Mirror Locations**.

    A list of mirror locations in the system appears.

23. In the upper-right corner of the main section, select +.

    The **Add Mirror Location** window appears.

24. Provide values as described in the following table.

Field	Description
MIRROR LOCATION NAME	Enter a name for the mirror location. A value is required and must be unique for the system.

Field	Description
SERVER MACHINES	Select the servers that you want to add to the mirror group (Mirror Server 2 and Mirror Node 2 in this example). This box contains a list of all the servers in the system. You must add minimum two servers to a mirror location.

25. Select **Add**.
    Mirror Node 2 is created.
26. Right-click Mirror Node 2, and then select **Add Data Store**.
    The **Add Data Store: Mirror Node 2** window appears.
27. Enter values as described in the following table.

Field	Description
DATA STORE NAME	Provide the same name that you provided while setting up mirror 1.
DESCRIPTION	Enter a description for the data store.
Set as default data store for the system	Select this check box if you want to set this data store as the default one. A default data store is the one that is considered if you do not specify a data store while adding a tag. You can set only one data store as default.

28. Select **Add**.
    Mirror 2 is configured.

Set up Mirror of Mirror:

29. Access Configuration Hub in the primary server in the OT network (Mirror Server 2).
30. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
    A list of systems appears in the main section.
31. Expand Mirror Server 1.
    A list of servers in the system appears.
32. Select +.
    The **Add Server Machine: <system name>** window appears.
33. Enter the host name or IP address of the mirror server in the IT network (Mirror Server 2 in the example), select the **Set as Mirror of Mirror** check box, and then select **Add**.
    The distributed server is added to the system. A distributed location is added in the server.
34. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.

A list of systems appears in the main section.

35. Expand Mirror Server 1.
    A list of servers in the system appears. In the example, Mirror Server 1, Mirror Node 1, and Mirror Server 2 appear.

A mirror of mirror is configured with one primary node and one mirror node each in the OT and IT networks. As needed, you can add more mirror nodes in each network.

Remove a Distributed/Mirror Server

- Delete the data stores *(on page)* in the machine (using the Web Admin console).
- If the machine is added to a mirror location, remove it from the location *(on page 1168)*.

You cannot delete the default server in a system.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appear in the main section.
3. Expand the system from which you want to remove a distributed/mirror server.
   A list of servers in the system appears.
4. In the row containing the server that you want to remove, select ⋯, and then select **Delete Server**.
   A message appears, asking you to confirm that you want to remove the distributed machine from the system.
5. Select **Delete**.
   The machine is removed from the system.

Set a Default Location

A default location is a server in a system which is considered when you do not specify a location while adding a data store *(on page 1089)*. By default, the distributed location in the primary server is the default location. You can, however, set a different default location. The following conditions apply when you set a default location:

- You can have only one default location in a system.
- You cannot delete a default location.
- You can set any of the distributed/mirror locations as default.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appears in the main section.
3. Select the system in which you want to set a default location.
   The details of the system appear in the **DETAILS** section.
4. Expand **System Defaults**, and then next to **Default Location**, select  .
   The **Default Location: <system name>** window appears. The **Location** box contains a list of all the servers in the system.
5. Select the location that you want to set as default, and then select **Set as Default**.
   The location is set as default.

Modify a Historian System

You can change the following details of a system:

- Name
- Description
- Default data store
- Default location (in case of a horizontally scalable system)

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system that you want to modify.
   The details of the system appear in the **DETAILS** section.
3. Modify values as specified in the following table.

Field	Description
Name	Enter a name for the Historian system. This value must be unique for a user.
Description	Enter a description for the system.

4. If you want to change the default data store:
   a. Under **System Defaults**, next to **Default Data Store**, select  .
      The **Default Data Store: <system name>** window appears.
   b. Select the data store that you want to set as default, and then select **Set as Default**.

The default data store is changed.

5. If you want to change the default location:

   a. Under **System Defaults**, next to **Default Location**, select  .
   The **Default Location: <system name>** window appears. The **Location** box contains a list of all the servers in the system.

   b. Select the location that you want to set as default, and then select **Set as Default**.

The changes to the system are saved automatically.

Configure Advanced Settings of a System

You can now configure a few advanced settings for the Archiver, Collector, and Data Store to achieve some specific functionality in Historian. You must be careful while modifying the configuration as this might impact the stability and security of the Historian System.

Ensure that you are a member of the iH Security Admins group.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appears in the main section.
3. Right-click the system whose advanced settings you want to configure, and then select **Advanced Configuration**.
   The advanced settings of the system appear, displaying the **Server** section by default.
4. Enter values as described in the following table.

Note:
If you have changed the values of any * marked fields, restart the Historian Data Archiver service. Only then will your changes be reflected.

Field	Description
ALARM TIMESTAMP CHECK	Specify whether you want to speed up, slow down, or disable alarm timestamp checking:

Field	Description
	◦ **0 - Disabled**: Select this option if you want to disable alarm timestamp checking. Only the data is sent to the alarm archiver. ◦ **1 - Fast**: Select this option if you want to check the time-stamp of the alarm data for the last 10 minutes. ◦ **2 - Slow**: Select this option if you want to check the time-stamp of the alarm data beyond the last 10 minutes.
ALLOW DATA OVERWRITES	Switch the toggle to enable or disable overwriting data.
ARCHIVER MEMORY SIZE	Enter the memory usage in MB that you want to allocate to an archive. If you enter 0, Data Archiver will dynamically allocate the memory usage. If Data Archiver is running on a 32-bit operating system, you can allocate upto 1800 MB. If Data Archiver is running on a 64-bit operating system, we recommend that you use the default value.
BUFER MEMORY MAX	Enter the maximum memory buffer size in MB that an archiver queue can use before switching to disk buffer.
COLLECTOR IDLE TIME (SECONDS)	Enter the number of seconds of no data collection after which a collector is considered idle.
DEBUG MODE	Specify whether you want to enable or disable the debug mode. If you enable this option, the debug information is included in the Historian log files, which helps you troubleshoot issues. However, this can result in large size of the log files.
DISABLE CA HOSTING	Enable CA Hosting to continue using the Client Access API based clients when you have converted a Mirror Primary to a standalone server while installing the Historian server.
DO NOT ZIP ARCHIVES	Switch the toggle to store the archive files as .zip files. This will help optimize the storage space of the archive files. However, if you are collecting alarm data as well, the alarm data may not be backed up. Also, you cannot export alarm data to another Data Archiver. Therefore, exercise caution while enabling this option if you are collecting alarm data as well.
FIREWALL PERMISSION	Use this parameter to disable port 14000 in the firewall. By default, Historian installation enables port 14000 in the firewall.

Field	Description
MAINTAIN AUTO RECOVERY FILE	Switch the toggle if you want to back up the archive and configuration files (.iha and .ihc files) every hour. This will prevent data loss. However, these files are used by Historian internally. Also, exercise caution in enabling this option because it can impact Historian performance.
MAX QUERY TIME (SECONDS)	Enter the maximum time in seconds that a query can take to process. After this time limit exceeds, the query is terminated.
MAXIMUM QUERY INTERVALS	Enter the maximum number of samples per tag that Historian can return from a query on non-raw data. You can use this setting to limit the number of query results on non-raw data.
NUMBER OF READ THREADS	Enter the number of read threads to use parallel reading of data. The minimum number you can enter is 8.
NUMBER OF WRITE THREADS	Enter the number of write threads to use parallel writing of data.
USE ADSI CALLS	Switch the toggle to allow Data Archiver to use Active Directory Service Interfaces (ADSI) calls.

5. Select **Save**.
6. Expand **Collector**, and then select the collector whose settings you want to configure.
   The fields specific to the selected collector appear.
7. Enter values as described in the following table.

Field	Description
BUFFER FLUSH MULTIPLIER	Select the multiplier to the buffer flow speed while using the store-and-forward feature: ◦ **0**: Select this option if you want to disable throttling. ◦ **1**: Select this option if you want normal speed. ◦ **2**: Select this option if you want the collector to never send data faster than twice the normal speed.
NUM INTERVALS FLUSH	Specify how quickly you want the collector to send data to Data Archiver. The value you enter in this field is multiplied by 100 milliseconds. For example, if you enter 5, the collector sends data to Data Archiver every 500 milliseconds. We recommend that you enter 5.

8. Select **Save**.
   A message appears, asking you whether you want to save and restart the collector as well.
9. If you want to save your changes and restart the collector as well, select **Save and Restart**. If you want to just save your changes, select **Save**. In that case, you must restart the collector later for the changes to reflect.
   Your changes are saved. If you have selected **Save and Restart**, the collector is restarted.
10. Expand **Data Store**, and then, select the data store whose settings you want to configure.
    The fields specific to the selected data store appear,
11. Enter values as described in the following table.

Field	Description
ALLOW FUTURE DATA	Switch the toggle to enable storing future data *(on page)*.
CREATE OFFLINE ARCHIVES	Switch the toggle to create offline archives. This is to avoid receiving an outside-active-hours error. It happens if you attempt to store data when the current archive file is set to read-only.

12. Select **Save**.
    The advanced settings are configured for the data store.

Configure Labels of Spare Fields

For each tag, a set of five spare fields are available, which are named Spare 1 to Spare 5. You can use these fields to enter values for any tag details apart from those captured in the tag fields (for example, the name, location, and phone number of the manufacturer of a device).

This topic describes how to change the label of these spare fields at the system level. The changes are then cascaded to all the tags in the system.

You can configure any or all of these fields. The new labels of the fields then appear under **SPARE FIELDS** in the **DETAILS** section when you access a tag.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system that you want to modify.
   The details of the system appear in the **DETAILS** section.
3. Right-click the system whose spare fields you want to configure (or select ⋯), and then select **Configure Spare Fields Labels**.
   The **Configure Spare Fields Labels: <system name>** window appears.
4. Enter values in the available fields, and then select **Save**.

For example, if you want to capture the name, location, and phone number of the manufacturer of a device, enter Name, Location, and Phone Number in the **SPARE FIELD 1 LABEL**, **SPARE FIELD 2 LABEL**, and **SPARE FIELD 3 LABEL** fields.
The labels of the spare fields are configured. When you access a tag, the new labels appear under **SPARE FIELDS** in the **DETAILS** section.

Note:
The labels that you have configured only appear in Configuration Hub. For other applications, such as Historian Administrator, Trend Client, and so on, Spare 1 to Spare 5 are displayed. The values of spare fields can be configured for tags.

Set a Default System

If you set a system as default, when you log in to Configuration Hub, this system appears by default. The following conditions apply when you set a system as default:

- You can have only one default system in Configuration Hub.
- You cannot delete a default system.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appears in the main section.
3. Right-click the system that you want to set as default (or select ⋯), and then select **Set as Default System**.
   The system is set as default.

Delete a Historian System

You can delete a Historian system if you no longer want to manage it using Configuration Hub. You cannot, however, delete a system if it is set as default.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   A list of systems appears in the main section.
3. Right-click the system that you want to delete (or select ⋯), and then select **Delete**.
   A message appears, asking if you want to delete the system.
4. Select **Delete**.
   The system is deleted.

Managing Mirror Locations

Create a Mirror Location

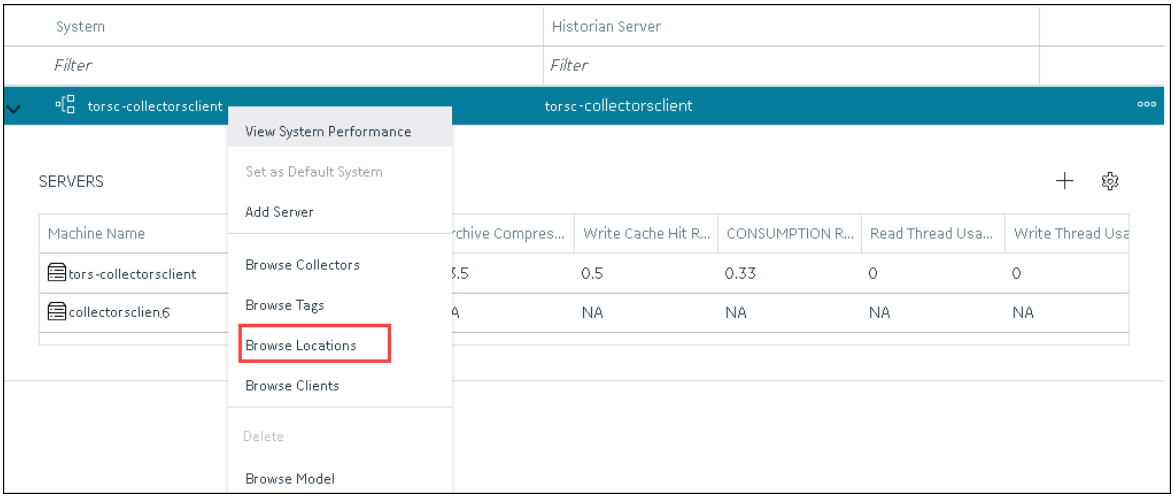
Add one or more distributed servers *(on page 1080)* to the system in which you want to create a mirror group.

If you want high availability of one or more data stores, you must create a mirror group (also called a mirror location), and then add servers to it. When you do so, the data in the data stores of the mirror locations is replicated. Therefore, even if one of the servers is down, you can retrieve data from the other servers in the mirror location, thus achieving high availability.

The following conditions apply when you create a mirror location:

- You must add minimum two servers to a mirror location. The maximum number of servers that you can add depends on your Historian license.
- You can add a mirror location only in a horizontally scalable Historian system.
- You can rename a mirror location, remove a machine from a mirror location, or add an additional one even after you create the mirror location. However, if only one machine remains in the group, you cannot remove it.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**. The **Systems** section appears, displaying a list of systems.
3. Right-click the system in which you want to create a mirror location (or select ⋯), and then select **Browse Locations**.



A list of distributed locations in the system appears.

4. Select **Mirror Locations**.
   A list of mirror locations in the system appears.
5. In the upper-right corner of the main section, select +.
   The **Add Mirror Location** window appears.
6. Provide values as described in the following table.

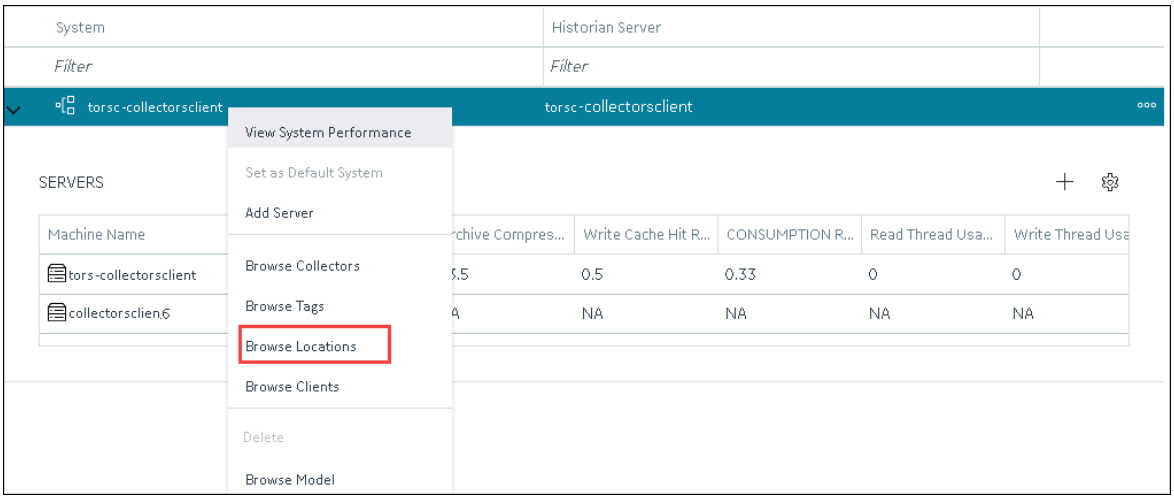
Field	Description
MIRROR LOCATION NAME	Enter a name for the mirror location. A value is required and must be unique for the system.
SERVER MACHINES	Select the servers that you want to add to the mirror group. This box contains a list of all the servers in the system. You must add minimum two servers to a mirror location.

7. Select **Add**.
   The mirror location is created.

Add a data store to the mirror location *(on page 1089)*.

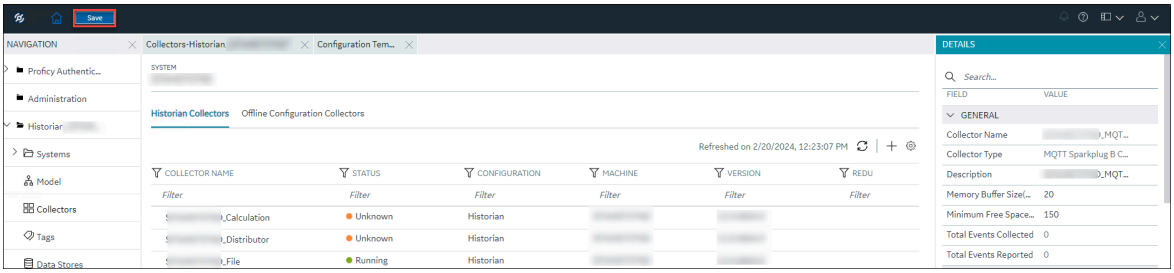
Rename a Mirror Location

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   The **Systems** section appears, displaying a list of systems.
3. Right-click the system in which you want to rename a mirror location (or select ⋯), and then select **Browse Locations**.



A list of distributed locations in the system appears.

4. Select **Mirror Locations**.
   A list of mirror locations in the system appears.
5. Select the location that you want to rename.
   The details of the mirror location appear in the **Details** section.
6. In the **Name** field, enter the new name of the mirror location.
7. In the upper-left corner of the page, select **Save**.



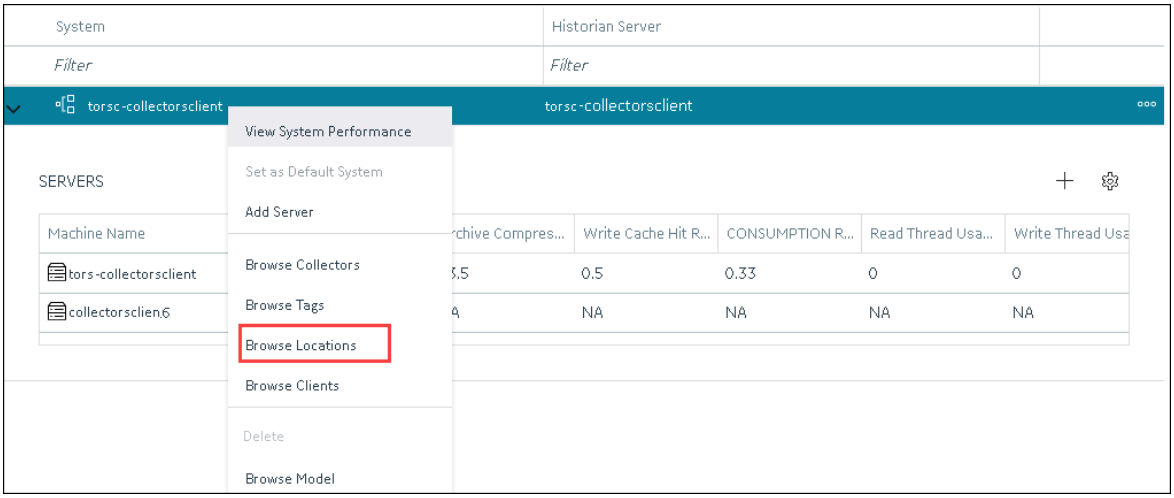
The mirror location is renamed.

Add a Machine to a Mirror Location

If you want to add machine to a mirror location that already contains machines,and if you want to copy the archive and configuration information from the existing machines to the new machine, perform the following steps:

1. Copy the archive files and configuration files from an existing machine in the mirror location to the one that you have added.
2. Rename the configuration file `<machine name>_Config.ihc`.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   The **Systems** section appears, displaying a list of systems.
3. Right-click the system to which you want to add a machine (or select ⋯), and then select **Browse Locations**.



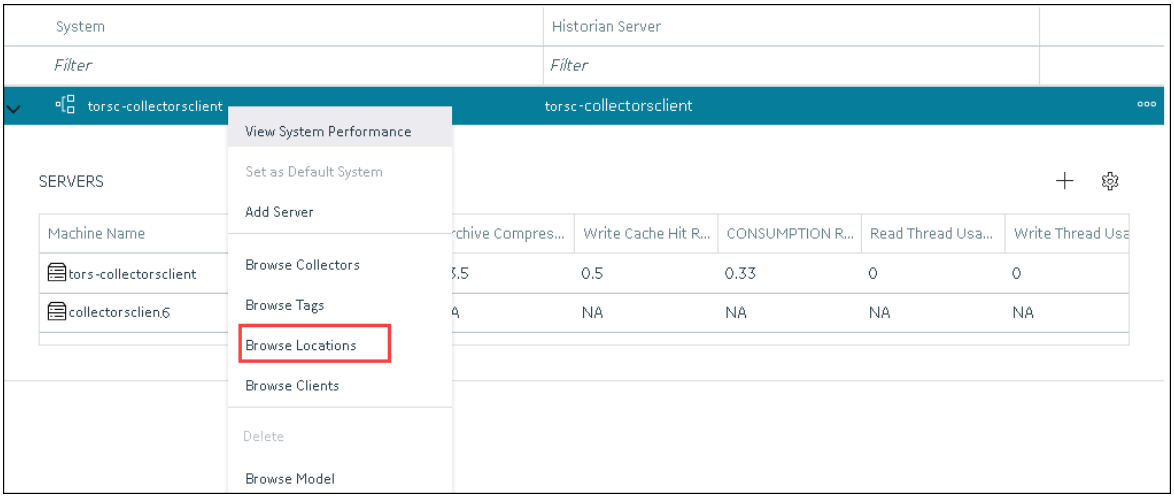
A list of distributed locations in the system appears.

4. Select **Mirror Locations**.
   A list of mirror locations in the system appears.
5. Right-click the mirror location in which you want to add a machine (or select ⋯), and then select **Add Server Machine**.
   The **Add Machine: <mirror location>** window appears. The **SERVER MACHINES** field contains a list of machines in the system that are not yet added to the mirror location.
6. In the **SERVER MACHINES** field, select the machine that you want to add to the mirror location, and then select **Add**.
   The machine is added to the mirror location.

Remove a Machine from a Mirror Location

If a mirror location contains only one machine, you cannot remove it.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   The **Systems** section appears, displaying a list of systems.
3. Right-click the system from which you want to remove a machine (or select ⋯), and then select **Browse Locations**.



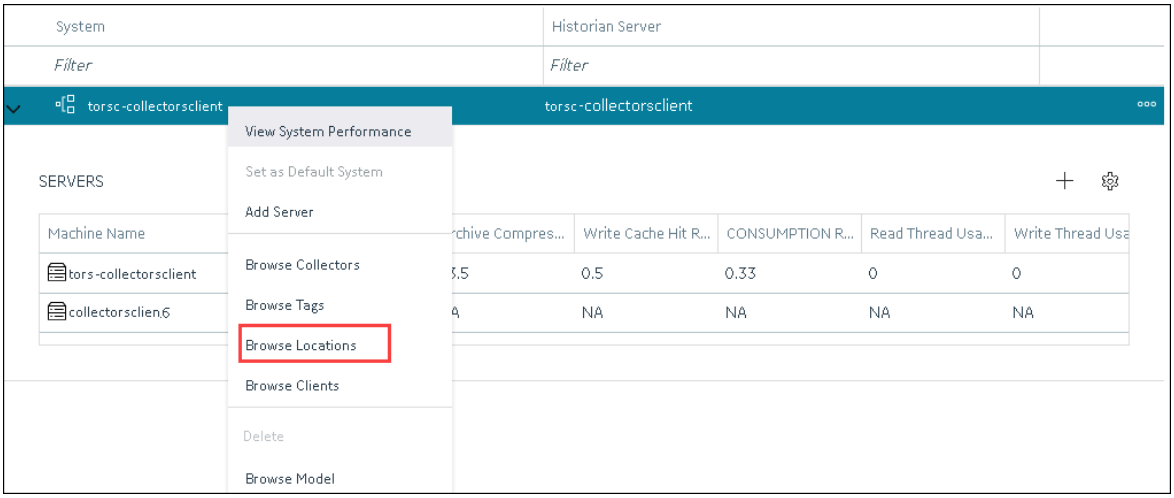
A list of distributed locations in the system appears.

4. Select **Mirror Locations**.
   A list of mirror locations in the system appears.
5. Right-click the mirror location from which you want to remove a machine (or select ⋯), and then select **Remove Server Machine**.
   The **Remove Server Machine: <mirror location>** window appears, displaying a list of machines in the mirror location.
6. Select the machine that you want to remove, and then select **Remove**.
   A message appears, asking you to confirm that you want to remove the machine from the mirror location.
7. Select **Remove**.
   The machine is removed from the mirror location.

Delete a Mirror Location

Delete all the data stores in the mirror location; you cannot delete a mirror location if it contains a data store.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Systems**.
   The **Systems** section appears, displaying a list of systems.
3. Right-click the system in which you want to delete a mirror location (or select ⋯), and then select **Browse Locations**.



A list of distributed locations in the system appears.

4. Select **Mirror Locations**.
   A list of mirror locations in the system appears.
5. Right-click the mirror location that you want to delete (or select ⋯), and then select **Delete Mirror Location**.
   A message appears, asking you to confirm that you want to delete the mirror location.
6. Select **Delete**.
   The mirror location is deleted.

Managing Data Stores

About Data Stores

A data store is a logical collection of tags. It is used to store, organize, and manage tags according to the data source and storage requirements. A data store can have multiple archive files (*.IHA), and includes both logical and physical storage definitions.

Tags can be segregated into separate archives through the use of data stores. The primary use of data stores is to segregate tags by data collection intervals. For example, you can put a name plate or static tags where the value rarely changes into one data store, and your process tags into another data store. This can improve query performance.

Historian data stores are stored as archive files that contain data gathered from all data sources during a specific period of time. You can write and read data from the archive files.

You can define two types of data stores:

- **Historical Data Store**: Tags stored under historical data store will store data as long as the disk space is available. Depending on your license, you may be able to create multiple historical data stores. The maximum number of historical data stores supported depends on the license.
- **SCADA Buffer Data Store**: Tags stored under the SCADA buffer data store will store data for a specific duration of time based on license.

When you install the Historian server, two historical data stores are installed by default.

- **System**: Stores Historian messages and performance tags. This is only for internal usage within Historian, and you cannot add tags to this data store. You cannot rename or delete the system data store.
- **User**: Stores tag data. This is a default data store. You can rename and delete a user data store as long as there is another default data store set for tag addition.

Based on your license, a SCADA Buffer data store may also be installed. It stores short-term tags and data.

Create a Data Store

The number of data stores that you can create depends on your license.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Sores**. Alternatively, you can select **Systems**, right-click the system in which you want to create a data store (or select ⋯), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Select +.
   If Historian Standard version, then the **Add Data Store** window appears.

   If Historian Enterprise version, then the **Add Data Store: <location name>** window appears.
4. Enter values as described in the following table.

Field	Description
DATA STORE NAME	Enter a unique name for the data store. A value is required. You can use all alphanumeric characters and special characters except / \ * ? < > |
DESCRIPTION	Enter a description for the data store.

Field	Description
LOCATION	Enter the host name or IP address of the distributed location on which you want to create the data store. This field is available only for a horizontally scalable system.
Is Default	Switch the toggle on if you want to set this data store as the default one. A default data store is the one that is considered if you do not specify a data store while adding a tag. You can set only one data store as default.

5. Select  .
   The data store is created.

   When you add tags to the data store, it will have its own set of .IHA (iHistorian Archive) files. Ensure that you back up the new data store archives periodically.

Access a Data Store

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**. Alternatively, you can select **Systems**, right-click the system in which the data store is available (or select ⋯), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Select the data store that you want to access.
   The **DETAILS** section displays the following details of the data store.

Table 23. General

Field	Description
Data Store Name	The name of the data store. A value is required and must be unique for the system.
Description	The description of the data store.
State	The current state of the data store: ◦ Running: Indicates that the data store is actively storing data. ◦ Stopped: Indicates that the data store is not storing data. This field is read-only.

Field	Description
Location	The host name or IP address of the distributed location on which the data store has been created. This field is available only for a horizontally scalable system. It is disabled.
Storage Type	The storage type of the data store, which can be one of the following values: ◦ **Historical:** Tags stored in a historical data store will store data as long as disk space is available. The maximum number of Historical data stores supported depends on the license. ◦ **SCADA Buffer:** Tags stored under SCADA buffer data store will store data for a specific duration of time based on license. This field is disabled.
System Default Storage	Indicates whether the data store is a default one. If yes, while creating a tag, this data store will be used by default.
Number of Tags	The number of tags in the data store. For instructions on how to add a tag, refer to Add Tags for the Data Store Using Configuration Hub *(on page 1077)* and Add a Tag Manually *(on page 1192)*.

Table 24. Archive Creation

Field	Description
Create Archive By	Indicates whether you want to create a new archive automatically after the current one reaches a specific size or after a specific duration. This field is enabled only if you switch the **Automatically Create Archives** toggle on. Select one of the following options: ◦ **Size**: Select this option if you want to create a new archive when the current one reaches a specific size. Specify the size in the **Default Size (MB)** field (which appears only if you select **Size**).

Field	Description
	◦ **Days** or **Hours**: Select one of these options if you want to create a new archive after a specific duration. Specify the duration in the **Archive Duration** field (which appears only if you select **Days** or **Hours**).
Default Size (MB)	The default size of an archive after which a new one will be automatically created if you switch the **Automatically Create Archives** toggle on. The **Default Size (MB)** field appears only if you select **Size** in the **Create Archive By** field.
Automatically Create Archives	Indicates whether you want to create an archive automatically *(on page 1446)* after the current one is full. An archive file is considered full based on the size or duration you specify in the **Create Archive By** and the **Archive Duration** or **Default Size** fields.
Overwrite Old Archives	Indicates whether you want to overwrite an old archive file when a new one is created. If you enable this option, the oldest archived data is replaced with the latest one when the latest archive default size is reached. Since this action deletes historical data, exercise caution in using this feature. Be sure that you have a backup of the archive so that you can restore it later. Best practice is to create an additional archive to prevent premature loss of data due to overwriting. For example, if you want to save 12 months of data into 12 archives, create 13 archives.
Archive Duration	The duration after which a new archive will be automatically created if you switch the **Automatically Create Archives** toggle on. The **Archive Duration** field appears only if you select **Days** or **Hours** in the **Create Archive By** field.
Multiple Archive Paths	Indicates whether you want to create multiple archive paths for the selected data store. This field allows you to back up your high-volume archives to another storage path, for example, an external storage disk. For more information, refer to about multiple archive path *(on page 1183)* and configure multiple archive paths *(on page 1187)*.

Table 25. Maintenance

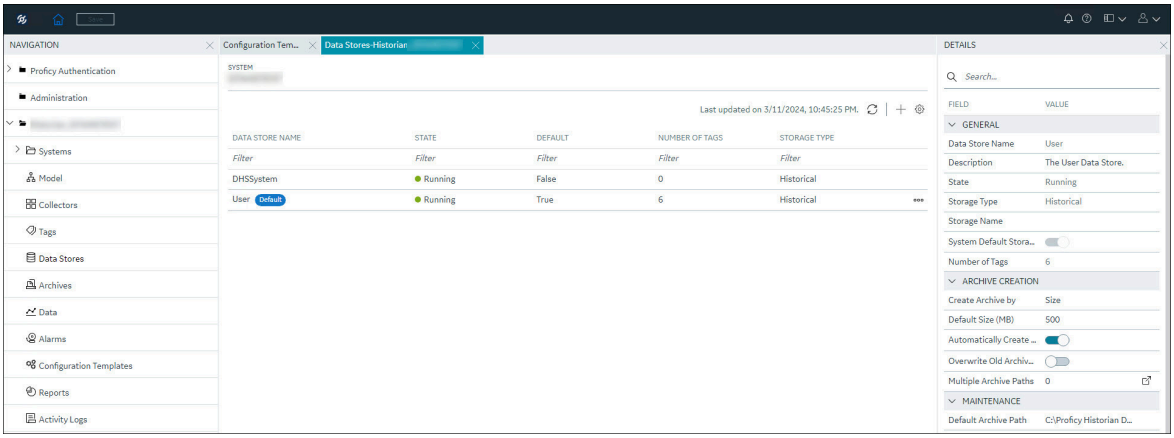
Field	Description
Default Archive Path	The default folder in which you want to create archives.
Default Backup Path	The default folder in which you want to place the backup archives.
Base Archive Name	A prefix that you want to add to all the archive name.
Base Archive Filename	A prefix that you want to add to all the archive filenames.
Free Space Required (MB)	Indicates the remaining disk space required after a new archive is created. If the available space is less than the requirement, a new archive is not created. The default value is 5000 MB. This field is not applicable to alarms and events archives. The alarms and events archiver will continue writing to the alarms and events archive until the drive is full. If this occurs, the alarms and events archiver will buffer incoming alarms and events data until the drive has free space. An error message is logged in the Historian message log.
Store OPC Quality	Indicates whether OPC data quality is stored.
Use Caching	Indicates whether caching is enabled. When reading data from the archiver, some data is saved in the system memory and retrieved using caching. This results in faster retrieval as the data is already stored in the buffer.
Stale Period (Days)	Indicates the number of days after which the data store is considered stale.
Stale Period Check (Days)	Indicates the number of days or the frequency for checking data store validity.

Table 26. Security

Field	Description
Data is Read-Only After (Hours)	The number of hours for data to be stored in a read/write archive. After the time lapses, that portion of the archive file is automatically made read-only. Incoming data values with timestamps prior to this time are rejected. A single archive file, there-

Field	Description
	fore, may have a portion made read-only, another portion that is read/write containing recently written data, and another that is unused free space.
Generate Message on Data Update	Indicates whether an audit log entry will be made any time the value of a previously archived data point is overwritten. This log entry will contain both the original and new values.
Read Group	The Windows security group that can retrieve the tag data and plot it in a trend chart for the selected data store. For example, if you select a group with power users, in addition to members of the iH Security Admins group, only a member of the power users group will be able to read data of the tags for that data store. Even a member of the iH Readers group will not be able to access data of the tags for the selected data store, unless they are also defined as a member of the power users group.
Write Group	The Windows security group that can write tag data for the selected data store (for example, using the Excel Add-in for Historian).
Administer Group	The Windows security group that can create, modify, and delete the tags for the selected data store.
For more information, refer to implementing Data store-level security *(on page)*. **Note:** When it comes to the group security, the security settings applied at the tag level, if any, take the precedence over those at the data store level.	

4. As needed, modify values in the available fields.
5. In the upper-left corner of the page, select **Save**.



The data store is modified.

Rename a Data Store

You cannot rename the system data store. You can rename a user data store as long as there is another default data store set for tag addition.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**.
   Alternatively, you can select **Systems**, right-click the system in which the data store is available (or select), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Select the data store that you want to access.
   The details section displays the following details of the data store.

Table 27. General

Field	Description
Data Store Name	The name of the data store. A value is required and must be unique for the system.
Description	The description of the data store.
State	The current state of the data store (whether it is running). This field is disabled.
Location	The host name or IP address of the distributed location on which the data store has been created. This field is available only for a horizontally scalable system. It is disabled.

Field	Description
Storage Type	The storage type of the data store, which can be one of the following values: ◦ **Historical:** Tags stored in a historical data store will store data as long as disk space is available. The maximum number of Historical data stores supported depends on the license. ◦ **SCADA Buffer:** Tags stored under SCADA buffer data store will store data for a specific duration of time based on license. This field is disabled.
System Default Storage	Indicates whether the data store is a default one. If yes, while creating a tag, this data store will be used by default.
Number of Tags	The number of tags in the data store. For instructions on how to add a tag, refer to Add Tags for the Data Store Using Configuration Hub *(on page 1077)* and Add a Tag Manually *(on page 1192)*.

Table 28. Archive Creation

Field	Description
Automatically Create Archives	Indicates whether you want to create a new archive *(on page 1442)* automatically after the current one is full. An archive file is considered full based on the size or duration you specify in the **Create Archive By** and the **Archive Duration** or **Default Size** fields.
Overwrite Old Archives	Indicates whether you want to overwrite an old archive file when a new one is created. If you enable this option, the oldest archived data is replaced with the latest one when the latest archive default size is reached. Since this action deletes historical data, exercise caution in using this feature. Be sure that you have a backup of the archive so that you can restore it later. Best practice is to create an additional archive to prevent premature loss of data due to

Field	Description
	overwriting. For example, if you want to save 12 months of data into 12 archives, create 13 archives.
Create Archive By	Indicates whether you want to create a new archive automatically after the current one reaches a specific size or after a specific duration. This field is enabled only if you switch the **Automatically Create Archives** toggle on. Select one of the following options: ◦ **Size**: Select this option if you want to create a new archive when the current one reaches a specific size. Specify the size in the **Default Size (MB)** field (which appears only if you select **Size**). ◦ **Days** or **Hours**: Select one of these options if you want to create a new archive after a specific duration. Specify the duration in the **Archive Duration** field (which appears only if you select **Days** or **Hours**).
Default Size (MB)	The default size of an archive after which a new one will be automatically created if you switch the **Automatically Create Archives** toggle on. The **Default Size (MB)** field appears only if you select **Size** in the **Create Archive By** field.
Archive Duration	The duration after which a new archive will be automatically created if you switch the **Automatically Create Archives** toggle on. The **Archive Duration** field appears only if you select **Days** or **Hours** in the **Create Archive By** field.

Table 29. Maintenance

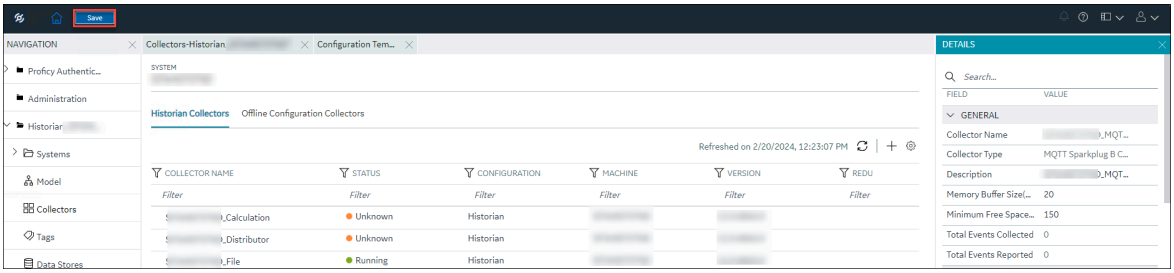
Field	Description
Default Archive Path	The default folder in which you want to create archives.
Default Backup Path	The default folder in which you want to place the backup archives.
Base Archive Name	A prefix that you want to add to all the archive files.
Free Space Required (MB)	Indicates the remaining disk space required after a new archive is created. If the available space is less than the requirement, a new archive is not created. The default value is 5000 MB.

Field	Description
	This field is not applicable to alarms and events archives. The alarms and events archiver will continue writing to the alarms and events archive until the drive is full. If this occurs, the alarms and events archiver will buffer incoming alarms and events data until the drive has free space. An error message is logged in the Historian message log.
Store OPC Quality	Indicates whether OPC data quality is stored.
Use Caching	Indicates whether caching is enabled. When reading data from the archiver, some data is saved in the system memory and retrieved using caching. This results in faster retrieval as the data is already stored in the buffer.

Table 30. Security

Field	Description
Data is Read-Only After (Hours)	The number of hours for data to be stored in a read/write archive. After the time lapses, that portion of the archive file is automatically made read-only. Incoming data values with timestamps prior to this time are rejected. A single archive file, therefore, may have a portion made read-only, another portion that is read/write containing recently written data, and another that is unused free space.
Generate Message on Data Update	Indicates whether an audit log entry will be made any time the value of a previously archived data point is overwritten. This log entry will contain both the original and new values.

4. As needed, modify values in the available fields.
5. In the upper-left corner of the page, select **Save**.

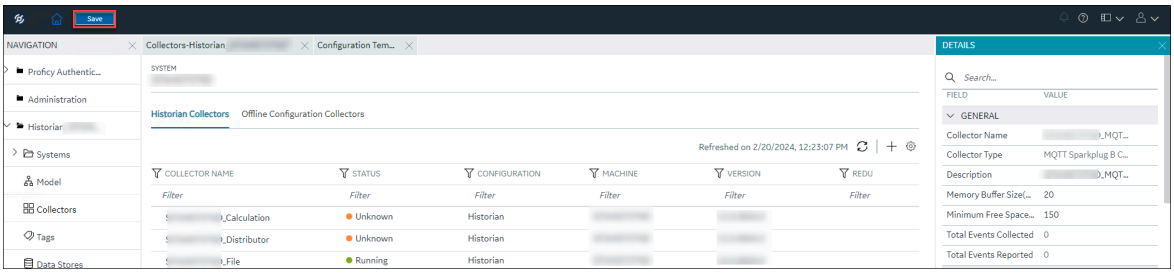


The data store is modified.

Set a Default Data Store

A default data store is the one that is considered if you do not specify a data store while adding a tag.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**. Alternatively, you can select **Systems**, right-click the system in which the data store is available (or select), and then select **Browse Data Stores**.
3. Select the system whose default data store you want to change.
   The details of the system appear in the **DETAILS** section.
4. Under **System Defaults**, next to **Default Data Store**, select .
   The **Default Data Store: <data store name>** window appears, displaying a list of data stores in the system.
5. Select the data store that you want to set as default, and then select **Set as Default**.
6. In the upper-left corner of the page, select **Save**.



The data store is set as default.

Access the Archives in a Data Store

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**. Alternatively, you can select **Systems**, right-click the system in which the data store is available (or select ⋯), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Right-click the data store whose archives you want to access (or select ⋯), and then select **Browse Archives**.
   The archives in the data store appear, indicating the current one and the old ones.

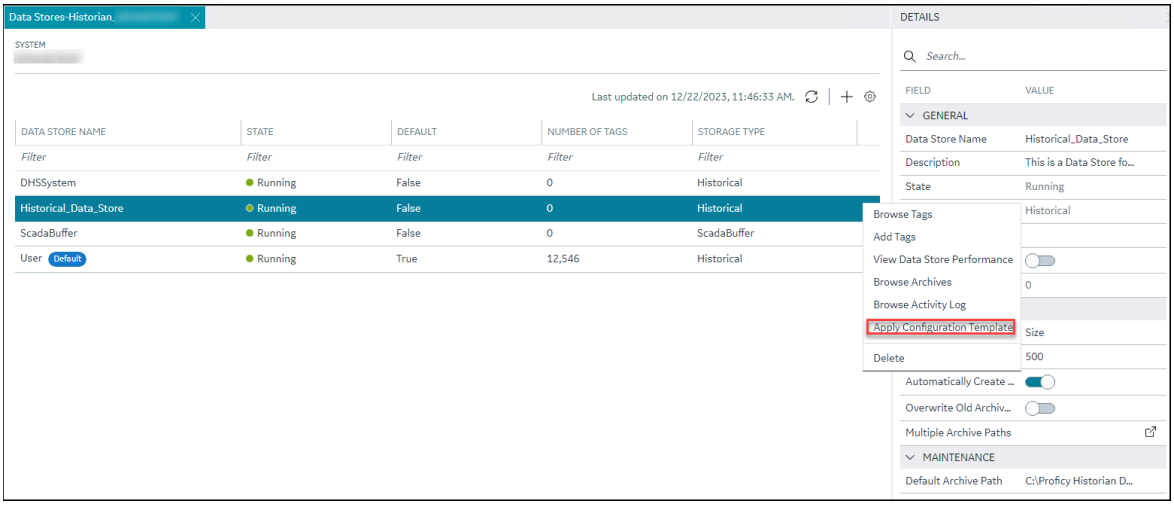
Apply the Configuration Template to a Data Store

You can apply the created template to user-created data store as needed. You will be prompted to confirm whether you want to overwrite few of the configuration values with the values in the template.

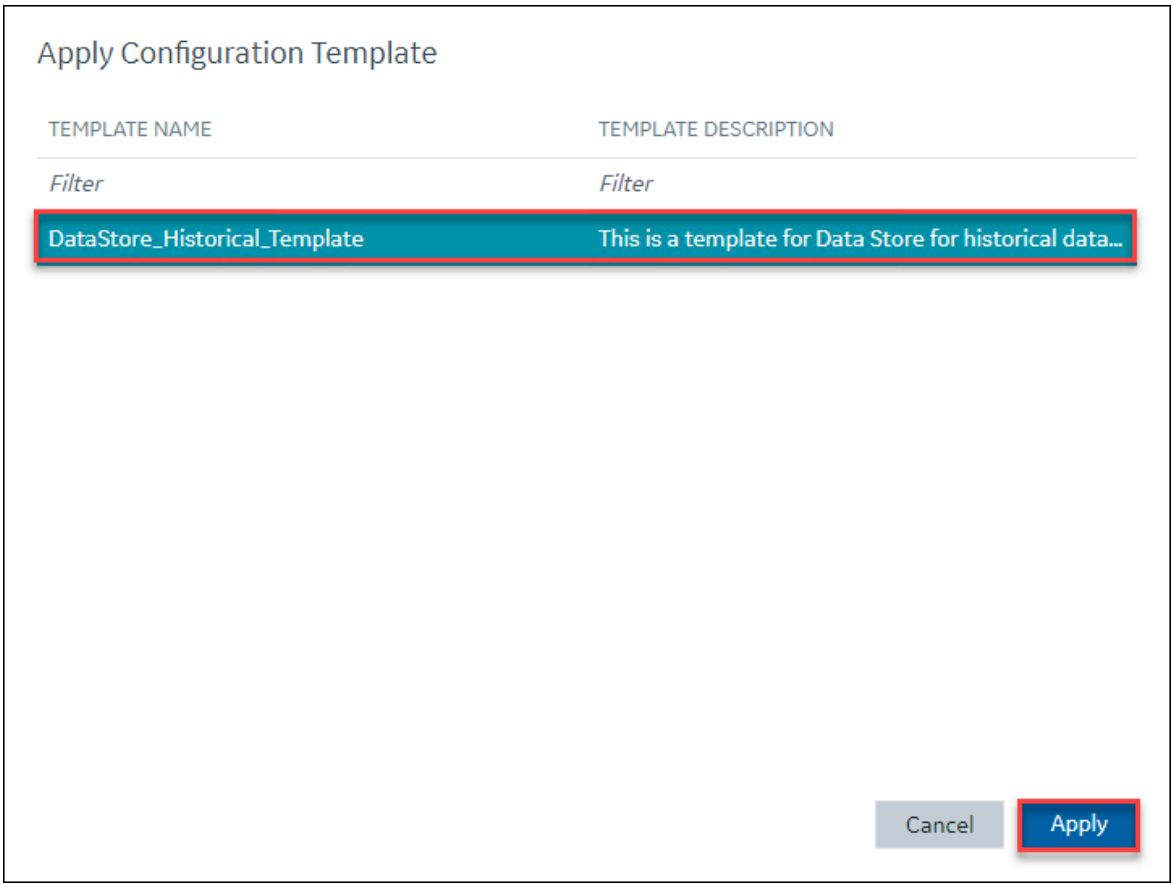
- Ensure that you have a data store created *(on page 1089)*.
- Ensure that you have a configuration template for data stores *(on page 1486)*.

This topic describes how to apply a data store configuration template to a data store. You can apply a data store configuration template to a user-created data store, provided they are not the default data store.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**.
   The **Data Stores** section appears.
3. Right-click the data store (or select ⋯), and then select **Apply Configuration Template**.



The **Apply Configuration Template** window appears, listing the available templates.



Note:
You can apply a data store configuration template to a user-created data store, provided they are not the default data store.

4. Select **Apply**.
   A confirmation window appears, prompting you to confirm whether you want to overwrite few of the configuration values with the values in the template.
5. Select **Ok**.
6. In the upper-left corner, select **Save**.
   The configurations in the template are applied to the data store.

Multiple Archive Paths

About Multiple Archive Paths

Multiple archive paths feature extends the ability to configure a default archive path for each data store.

This feature enables you to automatically store your archives in different locations based on the age of the archive. It can be useful when splitting the data for a data store across multiple hard drives, primarily for performance and cost optimization. Additionally, it could help optimize disk space constraints.

For instance, in a performance and cost optimization scenario, the most recent data could reside on a fast/expensive NVMe or SSD drive, intermediate data on a slower/cheaper local HDD, and older data on even slower/cheaper long-term storage (for example, NAS or cloud). The requirement for the drive is that it must be mapped to the Historian server node as a drive or folder and accessible by the DataArchiver service. For example, it could be a shared drive such as \\Server\HistorianData mapped to H:\HistorianData. The physical location of the drive does not matter if the DataArchiver service can access it.

Note:
There are many sources of drives and various methods to map them. The Historian team has not tested all possibilities and cannot guarantee compatibility with every configuration. However, if the drive can be accessed (with read and write permissions) by the DataArchiver service, it will likely function properly.

About Multiple Archive Path Configuration

Configuration for multiple archive paths can be done on a per-data store basis. Additionally, each data store could have different configurations, so you can decide whether you want to configure multiple archive paths for all the data stores or not. When configuring the archive paths, you can specify a path and an age.

Where,

The age defines how far in the past the archive end time must be before it could be moved.

The path is the directory where the archive will be moved to.

Once the end time of the archive becomes older than the current time minus the age, the archive will be moved. Since moving an archive can be a slow process, ensure that the archive is not modified during the move. Therefore, only archives that have become read-only can be moved. Archives become read-only when their end time is older than the **Data is Read Only After (Hours)** property. Therefore, be sure to set your time offsets greater than this property. If you set it smaller than this property, then the value of the property is used instead.

The duration of the move depends on the size of the archives and the speed of the source and destination disks. During the move, the source archive is still available for reading. Once the move has completed successfully, the source archive is deleted.

A move is stopped in the following scenarios:

- If a move failure occurs: The move is stopped, and an appropriate message is logged in the log file. The move retires later.
- If system shuts down during the move: The move is stopped. Since archives are being moved and deleted during this process, it is important to have proper backups of the system in case errors occur.

Note:
When configuring archive paths in a Mirror setup, the configured paths must exist on all mirror nodes.

Example of Multiple Archive Paths

Consider that your system setup includes the following:

- A fast NVME drive (N:), though not very large.
- A slow HDD (H:), which is larger compared to the fast NVME drive (N;).
- A remote NAS drive mapped to (Z:), the largest of the three drives.

Note:
All the three drives use the \Proficy Historian Data\Archives directory.

Your system design requirement is to have your frequently used data on the NVME for the best performance. The NVME drives greatly improve read and write performance than the traditional HDDs. Looking at your data access needs, data storage rate, and the NVME size, you decide to have three months of data there. You do the same for the HDD and decide to have nine months of data there. Data older than that goes to the NAS drive. For a simpler understanding, let us consider that you decide to have daily archives. Finally, you decide that data becomes read-only in a month.

Before you configure multiple archive paths, know the following:

- The multiple archive paths feature is available for any data store other than the System data store.
- While moving archives can be helpful, if not managed well, it may strain disk resources and impact system performance. Although it is ensured that system performance is not impacted by moving

archives, it is recommended that you move archives in smaller sizes and be mindful that your configurations do not affect system performance.

- Archive performance, particularly read performance, is crucial to be considered. When data is moved to slower drives, slower read performance is expected, but this is acceptable only for data on those slower paths. Data reads on faster paths should remain unaffected. To manage this, the Historian treats all paths except the default one as "slower" locations. Determining which archives are needed for queries can be challenging until after the query is executed.

  For instance, queries like "Raw By Number" reading backwards could require access to any archive in the past. However, queries with specific time ranges reveal which archives will be necessary. If the system identifies that archives on these "slower" drives are required, the query will be executed at a lower priority using Low Priority Read Threads. The configured number of read threads is divided into three categories: High, Medium, and Low, each with its specific number of threads. Additionally, each category can utilize lower priority threads if necessary.

  For example, a high priority query initially uses a High priority thread but can use a Medium or Low priority thread if all high priority threads are busy. The same flexibility applies to Medium priority queries. It is important to note that thread priority does not affect Windows thread priority; all threads run at the same Windows priority level, so executing queries on Low Priority threads does not affect their performance. Instead, it operates as a thread reservation system. By identifying and assigning "slow" queries to Low priority threads, High and Medium threads remain available for other queries. Generally, most queries are Medium priority unless programmatically changed. You must determine the appropriate number of read threads to configure to ensure adequate resources are provided.

Example Configuration procedure

1. Configure the default path. This can be done in the same way as you do for data stores. In this example, this is set to N:\Proficy Historian Data\Archives.
2. Configure the archive locations *(on page 1187)* based on the time.

Time Offset (Hours)	Path
2232 (3 months)	h:\Proficy Historian Data\Archives
8760 (1 year)	Z:\Proficy Historian Data\Archives

Based on the configuration, the DataArchiver will periodically look if any archives need to be moved. Only archives that are closed (that is, are time-based or have a fixed end time), and are read-only will be checked. The DataArchiver will check the archive's end time against each configured age, from smallest to

largest. The first age where the archive end time is older will be used to determine the directory to which the archive must move to.

So, based on this example, the following will happen:

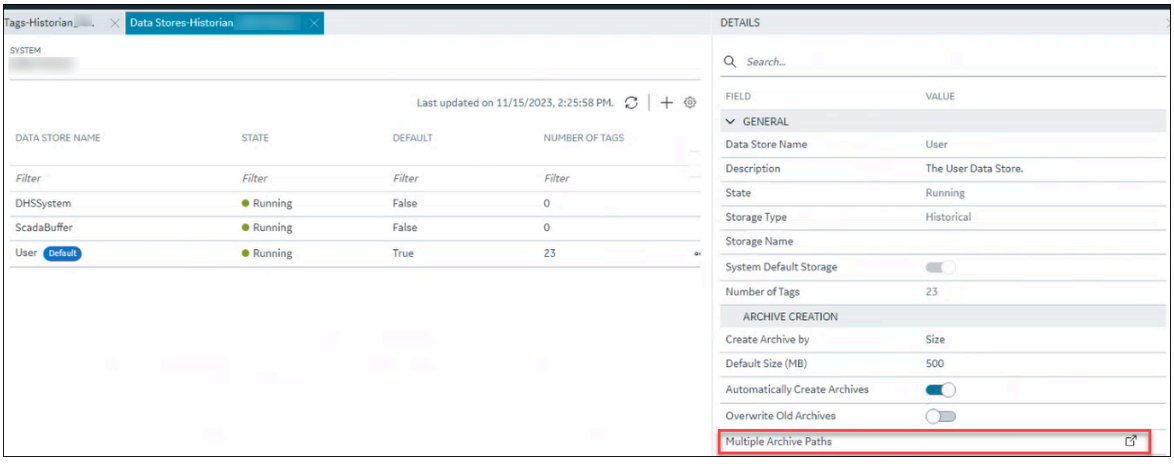
1. The newly created archive will go into the normal default path, that is, N:\Proficy Historian Data \Archives. That archive will exist and be written to until after a month. At that point, it will become read-only because that is what was configured.
2. When the archive is three months (2232 hours) old, the DataArchiver will move the archive to H: \Proficy Historian Data\Archive, as the end time is older than the 2232 hours that you configured and less than the 8760 hours. If the move is successful, the original archive is deleted. This process will repeat when the archive is older than 8760 hours.
3. Then it will be moved to Z:\Proficy Historian Data\Archives. Here it will stay unless the configuration is changed. If, for example, the 8760 was changed to 16520, then an archive that was 10000 hours old would be moved back to H:\Proficy Historian Data\Archives.

Configure Multiple Archive Paths

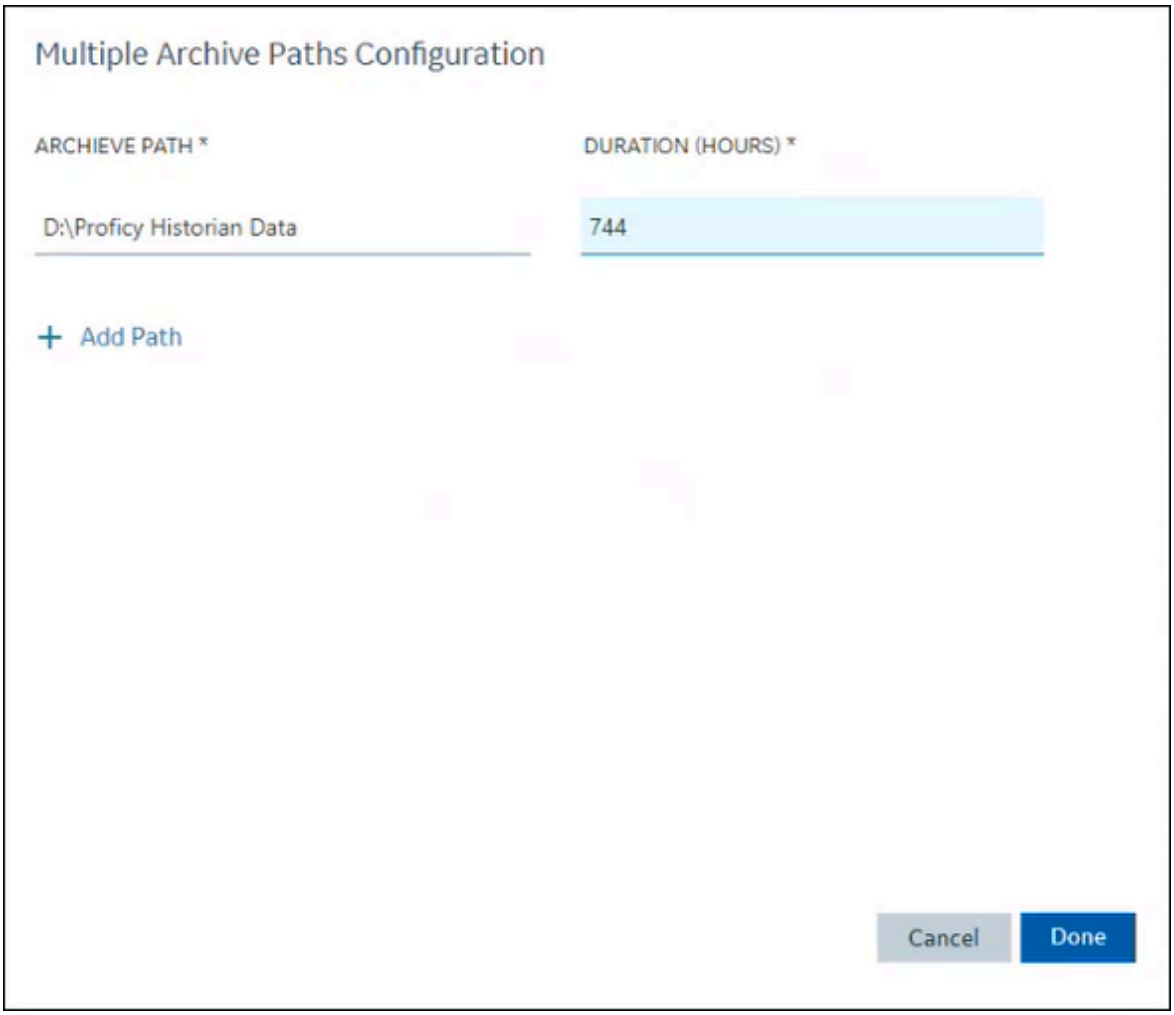
Multiple archive paths feature extends the ability to configure a default archive path for each data store.

- Ensure that you read about multiple archive paths *(on page 1183)*.
- You already have a **Default Archive Path** configured for this data store.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**. The **Data Stores** section appears.
3. Select the data store as needed.
   The **DETAILS** section displays the details of the data store.
4. In the **ARCHIVE CREATION** group, in the **Multiple Archive Paths** property, select ⧉.



The **Multiple Archive Paths Configuration** window appears.



5. In **ARCHIVE LOCATION**, enter the path as needed.
6. In **DURATION (HOURS)**, enter a duration after which the archive files should be transferred to the specified path.

> **Note:**
> The duration you specify must be greater than the archive hours specified in **Data is Read-Only After (Hours)** property.

7. To add more paths, select **Add Path**.
8. After you add the paths and duration as needed, select **Done**.
   The specified multiple archive paths are added. The archive files in the existing path will be transferred to the new path after the specified duration from their creation or modification.

Access the Activity Logs of a Data Store

Activity logs are generated when activities are performed on tags and collectors in a data store.

Examples:

- When a tag is created, modified, or deleted
- When a collector instance is created, modified, or deleted
- When data collection for a tag or a collector begins or ends
- When an archive is created or will be closed soon

You can access these logs for each tag/collector or for all the tags and collectors in a system. You can filter these logs based on the start and end dates, priority, topics, and the content in the logs. You can also export all the logs or selected ones.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**.
   Alternatively, you can select **Systems**, right-click the system in which the data store is available (or select ⋯), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Right-click the data store whose archives you want to access (or select ⋯), and then select **Browse Activity Logs**.
   The activity logs of the data store appear. You can filter on the Start Time and End Time along with other fields to search for activity log.

Access the Tags in a Data Store

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**.
   Alternatively, you can select **Systems**, right-click the system in which the data store is available (or select ⋯), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Right-click the data store whose tags you want to access (or select ⋯), and then select **Browse Tags**.
   The tags in the data store appear, indicating the current status of the data collection for each tag.

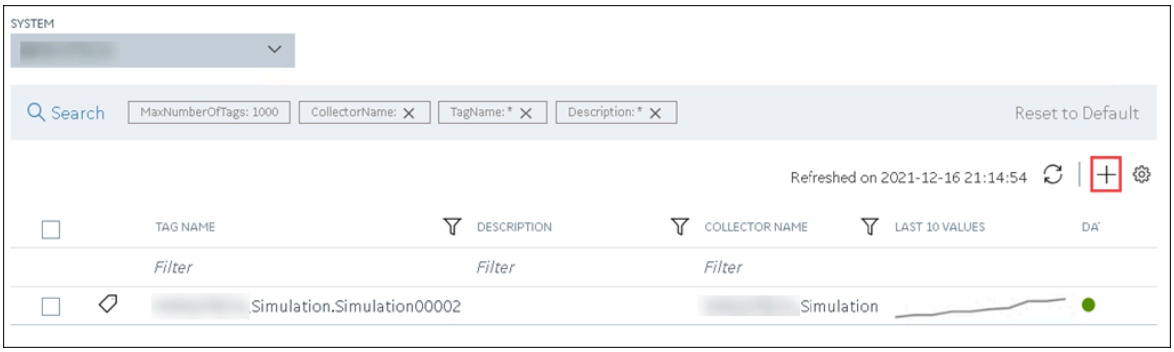
Add Tags for the Data Store Using Configuration Hub

- Add the collector instance *(on page 1076)* using which you want to collect data. Ensure that the collector is running.
- By default, the tag data is stored in the user data store, which is created automatically when you set up Configuration Hub. If, however, you want to store the data in a different data store, create it *(on page 1089)*.

This topic describes how to specify the tags for which you want to collect data by browsing through the tags in the data source. For example, for an iFIX collector, if there are 1,00,000 tags in the iFIX server, you must specify the ones for which you want to collect data. Only then data is collected for those tags.

In addition to adding tags from the data source, you can create tags manually *(on page 1192)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select +.

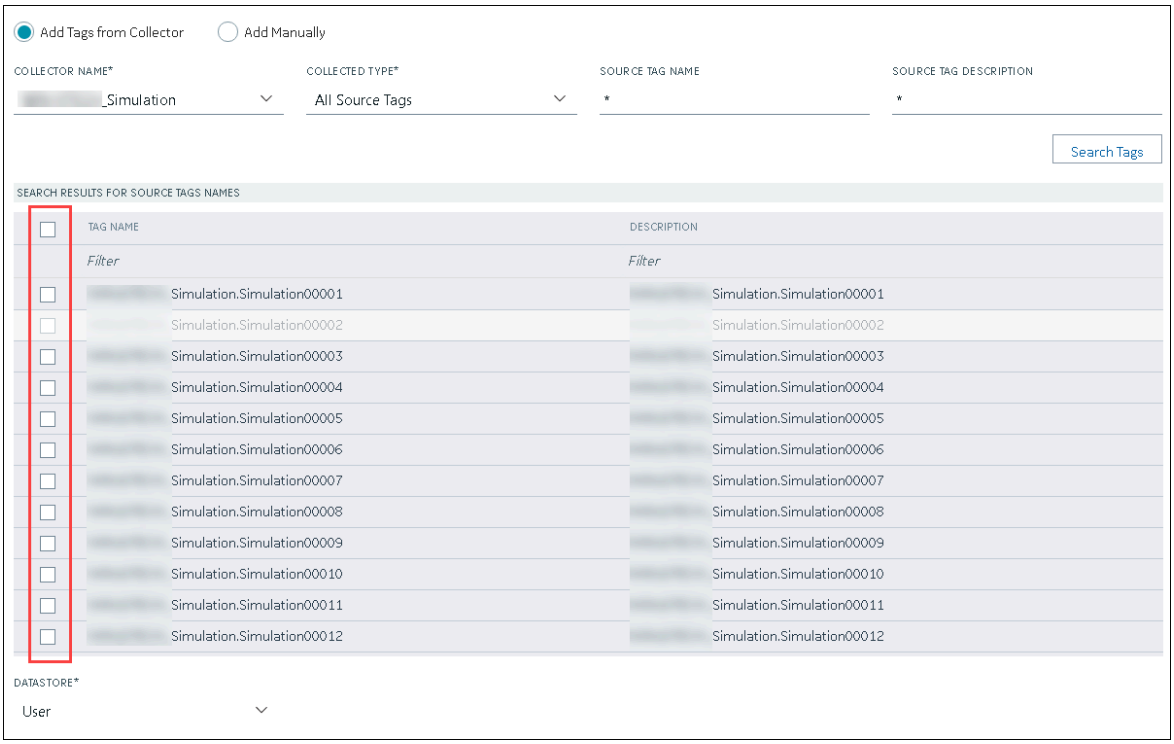


   The **Add Tag-<system name>** page appears. The **Add Tags from Collector** option is selected by default.
4. Enter values as described in the following table.

Field	Description
COLLECTOR NAME	Select the collector instance that you want to use to collect data. A value is required.
COLLECTED TYPE	Specify whether you want to browse through all the tags in the data source or only from the tags that you have not added yet. A value is required.

Field	Description
SOURCE TAG NAME	Enter the name of the tag (either completely or partially) to narrow down the search results.
SOURCE TAG DESCRIPTION	Enter the description of the tag (either completely or partially) to narrow down the search results.

5. Select **Search Tags**.
   A list of tags that match *all* the criteria that you have specified appears. If a tag is already added, it is disabled.
6. Select the check box corresponding to each tag for which you want to collect data.



7. In the **DATA STORE** field, if you want to store the data in a different data store than the user data store, select the same.
8. Select **Add Tag**.
   Data collection begins for the selected tags.

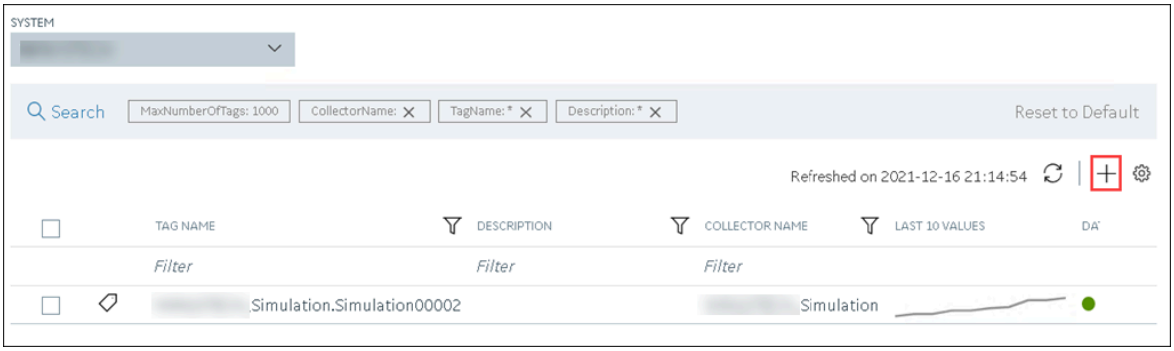
As needed, configure each tag by providing values for the tag properties. For information on the delta query modes, refer to Counter Delta Queries.

Add a Tag Manually

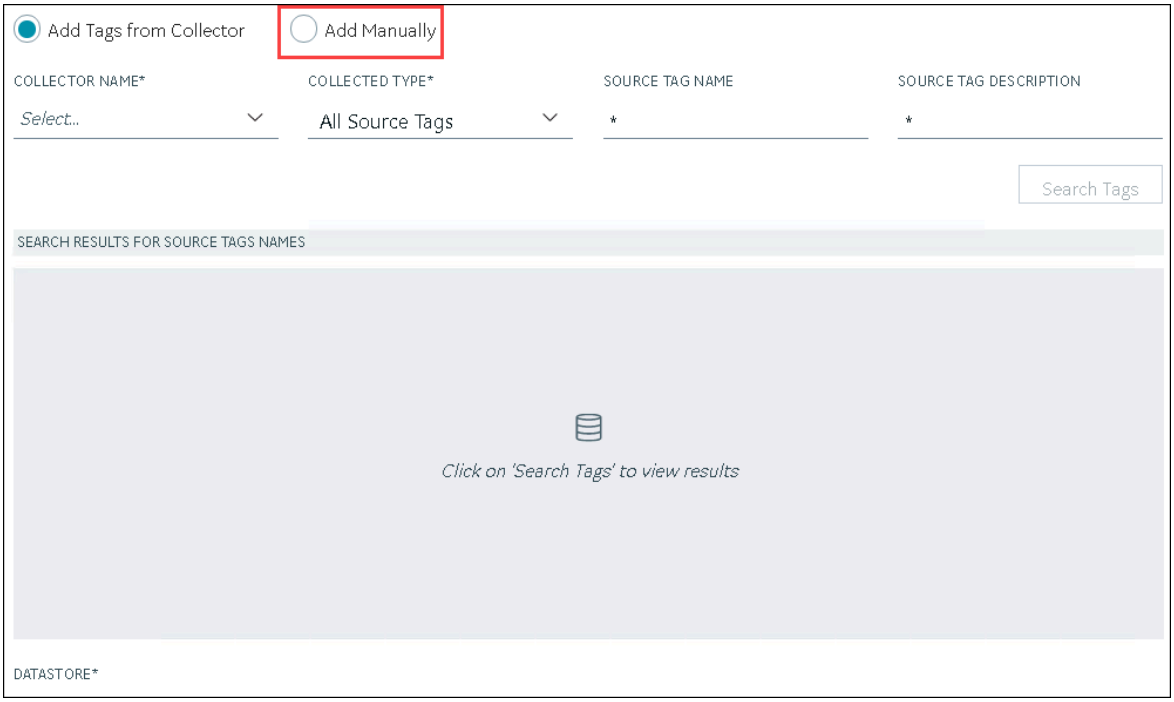
- Add the collector instance *(on page 1076)* using which you want to collect data.
- By default, the tag data is stored in the user data store, which is created automatically when you set up Configuration Hub. If, however, you want to store the data in a different data store, create it *(on page 1089)*.

After you create a collector instance, you specify which tags from the source must be used for data collection *(on page 1077)*. In addition, if you want to use the same tag twice (say, with a different collection interval or collector compression settings), you can add the tag manually. You can also create a calculation tag or a tag to store the values imported using the Excel Add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select +.



   The **Add Tag-<system name>** page appears. The **Add Tags from Collector** option is selected by default.
4. Select **Add Manually**.



5. Enter values as described in the following table.

Field	Description
COLLECTOR NAME	Select the collector instance that you want to use to collect data. If, however, this tag is not associated with a collector, you can leave the field blank (for example, you want to ingest this data manually instead of using a collector).
SOURCE ADDRESS	Specify the source tag to which you want to map the one you are creating. This field is enabled only if you select a value in the **COLLECTOR NAME** field. When you select ▫▫▫, the **Browse Source Tag: <collector name>** window appears. Provide the search criteria to find the tag that you want to map.
TAG NAME	Enter a name for the tag. A value is required and must be unique for the Historian server. The value that you enter: ◦ Must begin with a letter or a number. ◦ Can contain up to 256 characters.

Field	Description
	◦ Can include any of the following special characters: /!| #{}%$-_ ◦ Must not include a space or any of the following characters: ~`+^:;.,?"*=@
DATA TYPE	Select the data type of the tag data. To find out the data types supported by a collector, refer to the documentation on the collector that you have created. **Important:** If you select an unsupported data type, you may receive incorrect data or even lose data. If you select **Multi-Field**, the **USER-DEFINED TYPE NAME** field appears, and the **ENUMERATED SET** and **ARRAY TAG** fields are disabled. If you select **Fixed String**, the **STRING LENGTH** field appears.
STRING LENGTH	Enter the maximum character length allowed for the tag data. This field appears only if the value in the **DATA TYPE** field is **Fixed String**. A value is required. You can enter a value between 1 and 255. The default value is 8.
USER-DEFINED TYPE NAME	Select the user-defined data type (UDT) *(on page 1438)* that you want to assign to the tag. This field appears only if the value in the **DATA TYPE** field is **Multi-Field**. A value is required.
ENUMERATED SET	Select the enumerated set *(on page 1426)* that you want to assign to the tag. This field is not applicable for string and multi-field data types (enumerated sets) and for array tags.
ARRAY TAG	Switch the toggle to indicate whether the tag stores an array of data. This field is disabled if you select a value in the **ENUMERATED SET** field or if the value in the **DATA TYPE** field is **Multi-Field**. For information on array tags, refer to About Array Tags *(on page 1379)*.

Field	Description
TIME RESOLUTION	Select the time resolution for the tag. A value is required. For example, if you select **Seconds**, when you plot the data on a trend chart, the timestamp of the data points will be one second apart.
DATA STORE	If you want to store the data in a different data store that the user data store, select the same.

6. Select **Add Tag**.
   Data collection begins for the selected tags.

As needed, configure each tag by providing values for the tag properties. For information on the delta query modes, refer to Counter Delta Queries.

View the Performance of a Data Store

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**.
   Alternatively, you can select **Systems**, right-click the system in which the data store is available (or select ⋯), and then select **Browse Data Stores**.
   The **Data Stores** section appears.
3. Right-click the data store whose performance you want to access (or select ⋯), and then select **View Data Store Performance**.
   The performance of the data store appears, displaying the following information.

Field	Description
ARCHIVE COMPRESSION	The current effect of archive data compression. If the value is zero, it indicates that archive compression is either ineffective or disabled. To increase the effect of data compression, increase the value of archive compression deadbands on individual tags. In calculating the effect of archive compression, Historian counts internal system tags as well as data source tags. Therefore, when working with a very small number of tags and with compression disabled on data source tags, this field may indicate a value other than zero. If you use a realistic number of

Field	Description
	tags, however, system tags will constitute a very small percentage of total tags and will therefore not cause a significant error in calculating the effect of archive compression on the total system.
WRITE CACHE HIT	The hit ratio of the write cache in percentage of total writes. It is a measure of how efficiently the system is collecting data. Typically, this value should range from 95 to 99.99%. If the data is changing rapidly over a wide range, however, the hit percentage drops significantly because current values differ from recently cached values. More regular sampling may increase the hit percentage. Out-of-order data also reduces the hit ratio.
RECEIVE RATE	Indicates how busy the server is at a given instance and the rate at which the server is receiving data from collectors.
FREE SPACE	Indicates how much disk space (in MB) is left in the current archive.
CONSUMPTION RATE	Indicates how fast the archive disk space is consumed. If the value is too high, you can reduce it by slowing the poll rate on selected tags or data points or by increasing the filtering on the data (widening the compression deadband to increase compression).
EST. DAYS TO FULL	Indicates how much time is left before the archive is full, based on the current consumption rate. This value is dynamically calculated by the server and becomes more accurate as an archive file gets closer to completion. This value is only an estimate and will vary based on a number of factors, including the current compression effectiveness. The system sends messages notifying you at 5, 3, and 1 days until full. After the archive is full, a new archive must be created (can be automatic or manual). To increase this value, you must reduce the consumption rate. To ensure that collection is not interrupted, make sure that the **Automatically Create Archives** option is enabled. You may also want to enable the **Overwrite Old Archives** option if you have limited disk capacity. Enabling this option, however,

Field	Description
	means that some old data will be lost when new data overwrites the data in the oldest online archive. Use this feature only when necessary.
FAILED WRITES	Indicates the number of samples that failed to be written. Since failed writes are a measure of system malfunctions or an indication of offline archive problems, this value should be zero. If you observe a non-zero value, investigate the cause of the problem and take corrective action. Historian also generates a message if a write fails. Note that the message only appears once per tag, for a succession of failed writes associated with that tag. For example, if the number displayed in this field is 20, but they all pertain to one Historian tag, you will only receive one message until that Historian tag is functional again.
ALERTS SINCE STARTUP	Indicates a count of system warnings or alerts generated since the last startup. A high value here may indicate a problem of some kind. You should review the alerts and determine the probable cause. The count resets to zero on restart. The message database, however, may contain more alerts than this value.
MESSAGE SINCE STARTUP	Displays a count of system messages generated since the last startup. The system resets the value to zero on restart. The message database, however, may contain more messages than this value.

Delete a Data Store

The following conditions apply when deleting a data store:

- You cannot delete the system data store.
- You cannot delete a data store if it contains tags. If you remove the tags from the system or permanently delete them, you can delete the data store. However, the archives are not deleted.
- You cannot delete the default data store. You can delete a user data store as long as there is another default data store set for tag addition.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**.
   The **Data Stores** section appears.
3. Right-click the data store that you want to delete (or select ⋯), and then select **Delete**.
   A message appears, asking you to confirm that you want to delete the data store.
4. Select **Delete**.
   The data store is deleted. However, the archives in the data store are not deleted.

Adding a Collector Instance

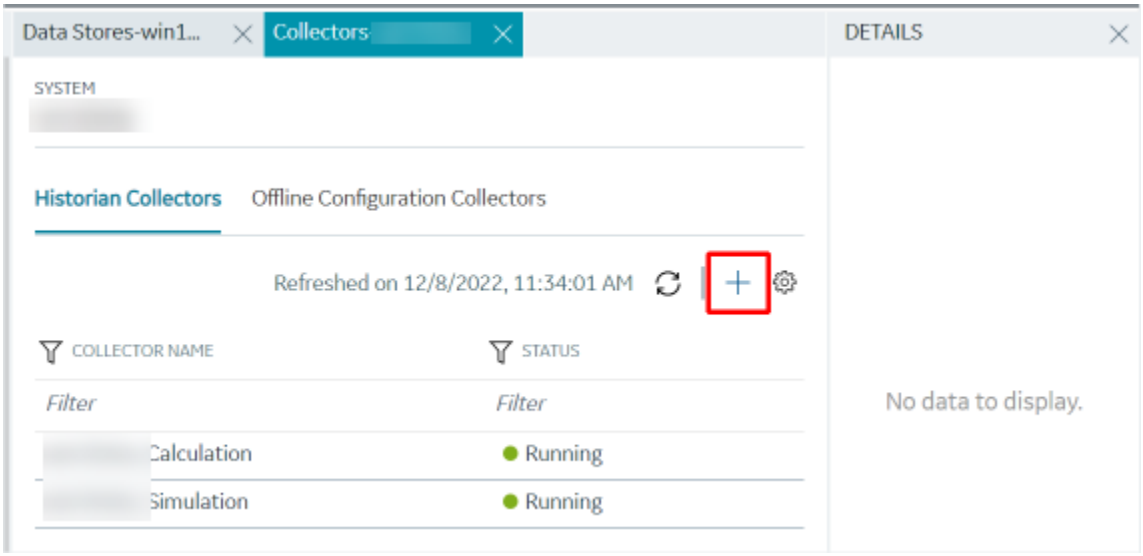
Add and Configure a Calculation Collector

Using the Calculation collector, you can perform data calculations on values already in the archiver. It retrieves data from tags in the Historian archive, performs the calculation, and then stores the resulting values into new archive tags.

You can create a Calculation collector only for an on-premises Historian server, not for a cloud destination.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Calculation Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears. The **HISTORIAN SERVER** field is disabled and populated.
7. Select **Next**.
   The **Destination Configuration** section appears. Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default; the other options are disabled. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the value you selected in the **MACHINE NAME** field in the **Collector Selection** section.
8. If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
9. Select **Next**.
   The **Collector Initiation** section appears.
10. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:

- Must be unique.
- Must not exceed 15 characters.
- Must not contain a space.
- Must not contain special characters except a hyphen, period, and an underscore.

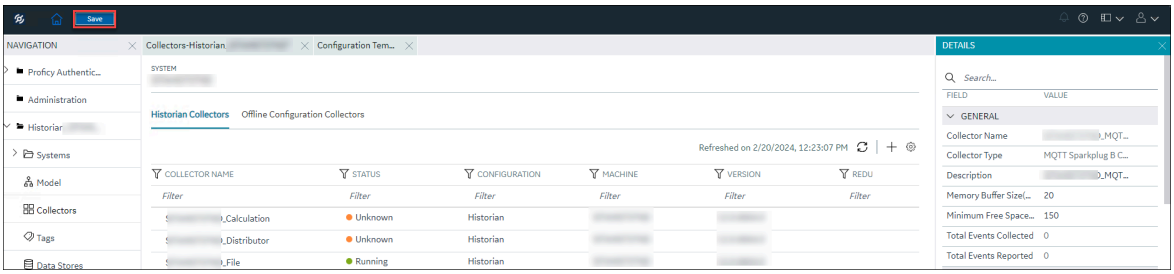
11. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
        - iH Security Admins
        - iH Collector Admins
        - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
12. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
13. Under **COLLECTOR SPECIFIC CONFIGURATION**, configure values as described in the following table.

Field	Description
Calculation Timeout (sec)	The maximum time a calculation must be performed before being terminated. The default value is 10 seconds. If the calculation takes longer, it is cancelled, and a bad data quality sample is stored in the destination tag with a subquality, calculation error.
Max Recovery Time (hr)	The maximum time, in hours till now, that the collector will attempt to restore data. This is applicable only to event-based tags. The default value is 4 hours. If you want to disable automatic calculation of the tag, set the value of this field to 0.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.

Field	Description
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

14. If needed, enter values in the other sections *(on page 1298)*.
15. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

16. If needed, restart the collector.

Specify the tags *(on page 1077)* whose data you want to collect using the collector.

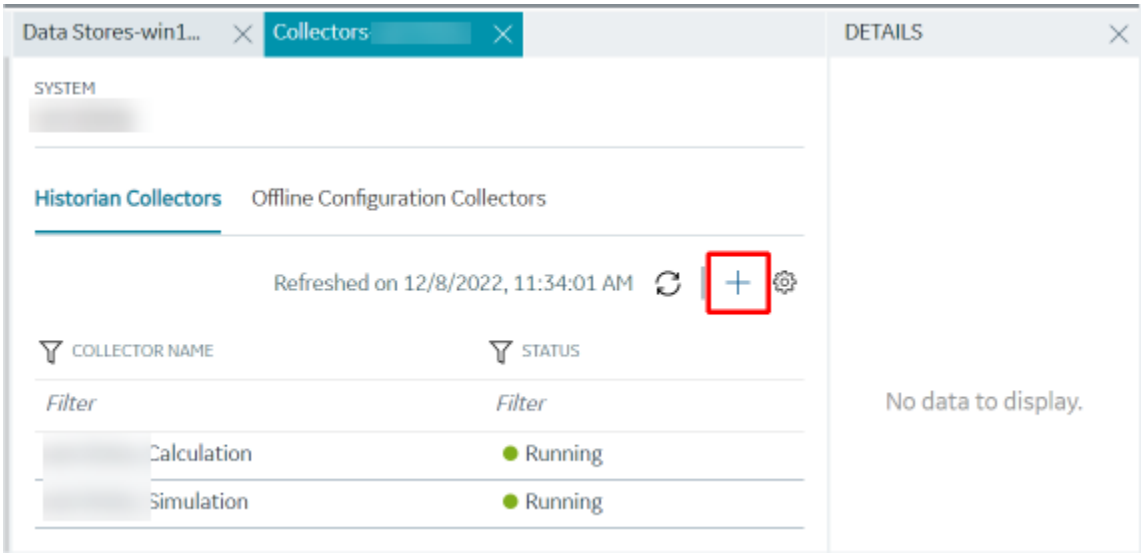
Add and Configure a CygNet Collector

A CygNet collector collects data from a CygNet server and stores it in the Historian server. For more information, refer to Overview of the CygNet Collector *(on page)*.

> **Note:**
> You cannot send data to a cloud destination using a CygNet collector.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Cygnet Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. In the **SERVER SITE** field, enter the host name or IP address of the CygNET server from which you want to collect data.
8. Select **Next**.
   The **Destination Configuration** section appears. Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default; the other options are disabled.
9. If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.
10. Select **Next**.
    The **Collector Initiation** section appears. The **COLLECTOR NAME** field is populated with a value in the following format: `<Historian server name>_Cygnet`
11. If needed, modify the value in the **COLLECTOR NAME** field.

The value that you enter:

- Must be unique.
- Must contain the string `Cygnet`.
- Must not exceed 15 characters.
- Must not contain a space.
- Must not contain special characters except a hyphen, period, and an underscore.

12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default, this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

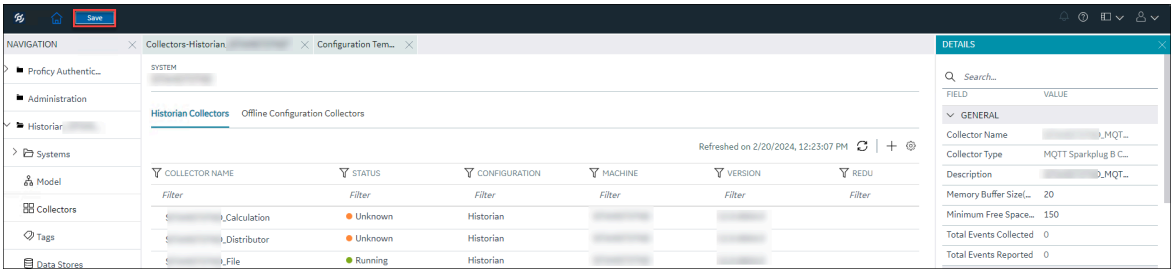
      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
13. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
14. Under **COLLECTOR SPECIFIC CONFIGURATION**, configure values as described in the following table.

Field	Description
Recovery Time	The maximum time, in hours, for which the collector will attempt to recover data after the collector is started or when connection between the collector and the CygNet server is re-established. This time is calculated as the duration between the current time and the last known write time. Continuous data collection is resumed only after the previous data has been recovered. By default, this value is set to 0, which means data recovery is not attempted. The maximum value you can provide is 168 hours (that is, 7 days).

Field	Description
Thread Count	The maximum number of threads that you want to collector to use to query data from the CygNet server.
CygNet Debug Mode	The debug mode for the collector. You can enter a value between 0 and 255, where 0 turns off debugging and 255 enables detailed debugging (with query transactions). **Note:** Do not turn on debugging for a long period. If you do so, very large log files are created, which can consume a great deal of disk space. We recommend a maximum of 10 minutes.
General Optimized	Indicates whether you want to apply optimization on the tag data reads.
Service-Site	Identifies the CygNet site or data source from which the CygNet collector collects data. A value is required.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. If needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

Specify the tags *(on page 1077)* whose data you want to collect using the collector.

Add and Configure a File Collector

A File collector is used to send data from one Historian server to another one.

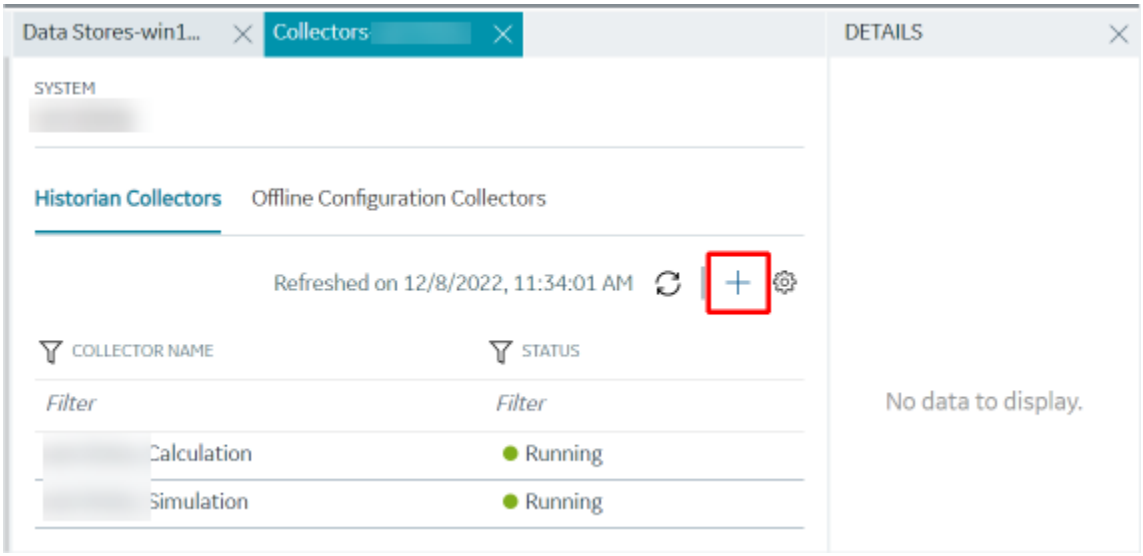
Note:

- You cannot send data to a cloud destination using the File collector.
- You can create only one instance of the File collector.

For more information, refer to Overview of the File Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance. The collector will send data to this machine.
5. In the **COLLECTOR TYPE** field, select **File Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Destination Configuration** section appears. Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default; the other options are disabled.
7. If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.
8. Select **Next**.
   The **Collector Initiation** section appears. The **COLLECTOR NAME** field is populated with a value in the following format: `<Historian server name>_File`
9. If needed, modify the value in the **COLLECTOR NAME** field.
   The value that you enter:
   - Must be unique.
   - Must not exceed 15 characters.

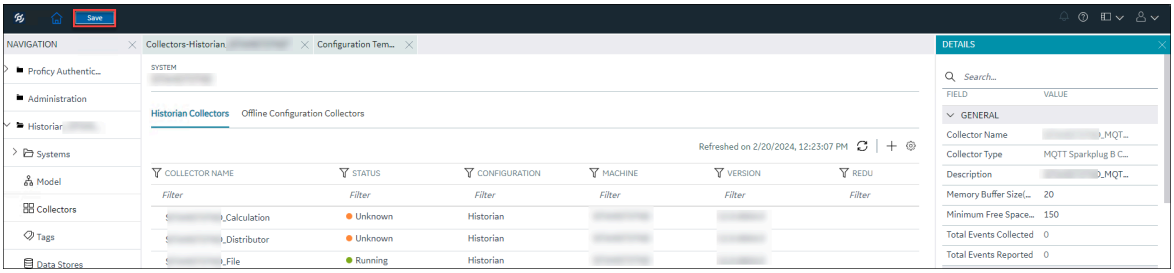
- Must not contain a space.
- Must not contain special characters except a hyphen, period, and an underscore.

10. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default, this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
        - iH Security Admins
        - iH Collector Admins
        - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
11. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
12. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
Scan Interval	The interval, in seconds, after which the collector initiates an import operation. The maximum value that you can enter is 65.
CSV File Spec	The file extension for a CSV file to be imported. You can specify more than one extension type, such as csv, txt, dat.
XML File Spec	The file extension for an XML file to be imported.
Purge Processed (days)	The number of days after which you want the contents of the `Processed Files` folder to be automatically purged.
Purge Error (days)	The number of days after which you want the contents of the `Error Files` folder to be automatically purged.

13. Ad needed, enter values in the other sections common to all collectors *(on page 1298)*.
14. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

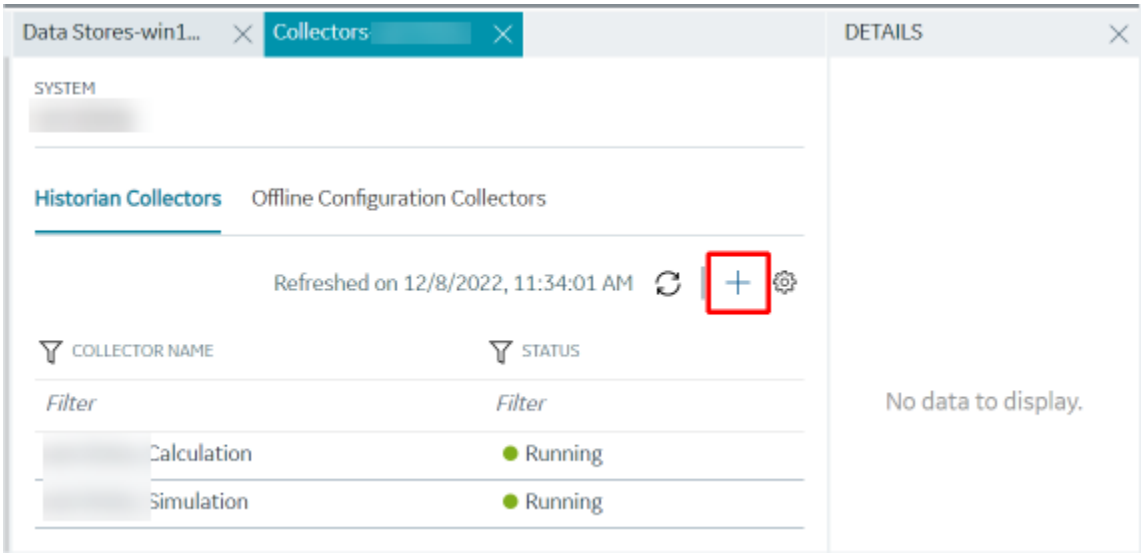
15. If needed, restart the collector.

Import files using the collector *(on page)*.

Add and Configure a HAB Collector

The HAB collector collects data from Habitat, which is a SCADA application that contains real-time data. The collector interacts with the Habitat Sampler application to fetch data from the Habitat database records and stores the data in a Historian server. For more information, refer to Overview of the HAB Collector *(on page)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. On the right, next to Settings in the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Hab Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter values as described in the following table.

Field	Description
SERVER SITE	Enter name that you want to assign to the site. A value is required and must be unique. It is used by Habitat to identify the collector instance. By default, this field is populated with a value in the following format: `<Historian server name>Hab`
SERVER 1 (under NODE 1)	Enter the host name or IP address of the Habitat server in the primary site from which you want to collect data. This server acts as the primary/active server from which the collector receives data. A value is required.
SERVER 1 (under NODE 2)	Enter the host name or IP address of the Habitat server in the second/backup site from which you want to collect data. This server acts as a standby server in case server 1 under node 1 fails. A value is required. If you do not have a secondary/backup site, enter the same value as **SERVER 1** under node 1.
SERVER 2 (under NODE 1)	Enter the host name or IP address of the Habitat server that you want to use as a standby server in the same site as server 1. This server acts as a standby server in case server 1 under node 2 fails.
SERVER 2 (under NODE 2)	Enter the host name or IP address of the Habitat server in the secondary/backup site from which you want to collect data. This server acts as a standby server in case server 2 under node 1 fails. For example, suppose Machine A and Machine B are in node AB, and Machine X and Machine Y are in node XY. Suppose you

Field	Description
	want to use Machine A as the primary server and the remaining machines as standby servers. In that case, enter values as follows: ◦ **SERVER 1** (under Node 1): `Machine A` ◦ **SERVER 2** (under Node 1): `Machine B` ◦ **SERVER 1** (under Node 2): `Machine X` ◦ **SERVER 2** (under Node 2): `Machine Y` If Machine A fails, the Machine B becomes active. If Machine B fails, Machine X becomes active. If Machine X fails, Machine Y becomes active.
SOCKET	The socket number (port number) used by the Habitat Sampler application to connect. Each collector instance can connect to only one socket. The default value is 8040.
RETRY	The duration, in seconds, after which the collector tries to communicate with the site. The default value is 5 seconds.

8. Select **Next**.
   The **Destination Configuration** section appears. Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. The other options are disabled because you cannot send data to a cloud destination using the HAB collector.
9. If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.
10. Select **Next**.
    The **Collector Initiation** section appears. By default, the **COLLECTOR NAME** field is populated with a value in the following format: `<Historian server name>_Hab`
11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    ◦ Must be unique.
    ◦ Must not exceed 15 characters.

- Must not contain a space.
- Must not contain special characters except a hyphen, period, and an underscore.

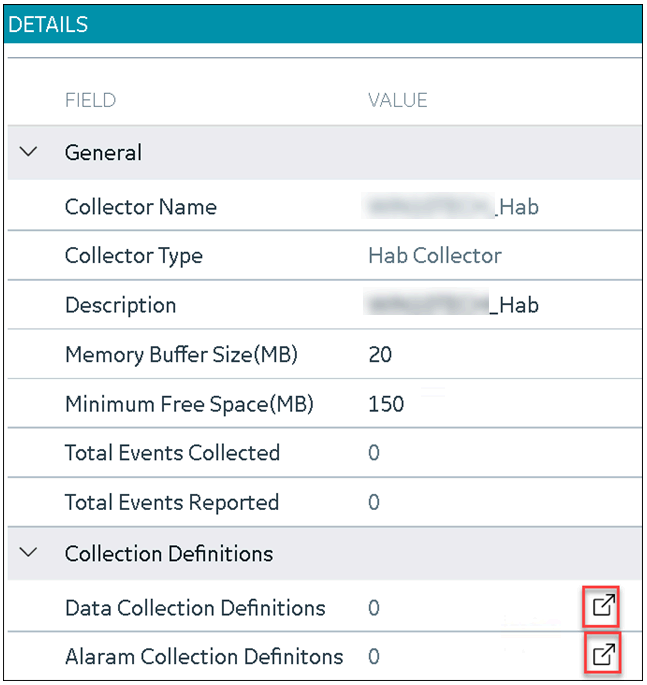
12. In the **SamplerID** field, enter the user ID to connect to Habitat Sampler.

    By default, this field contains the Collector Name. You can first provide the Collector Name and update the Sample ID field as this filed will automatically takes the Collector Name.

13. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled. By default, this option is selected.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

14. Select **Add**.
    The collector instance is added. The fields specific to the collector appear in the **DETAILS** section.
15. Depending on whether you want to configure tags or alarms, select  next to the corresponding field under **Collection Definitions**.



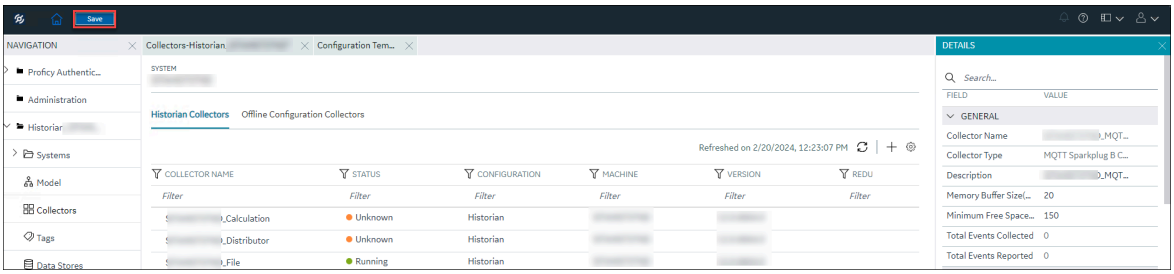
The **Data Collections** or **Alarm Collections** section appears.

16. Select +, and then enter values in the available fields for data collection and/or alarm collection *(on page 1214)*. You can also copy a collection definition by right-clicking it and selecting **Duplicate**.
17. Under **COLLECTOR SPECIFIC CONFIGURATION**, configure values as described in the following table.

Field	Description
Auto Tag Sync	If you enable this option, the collector creates tags automatically in Historian based on the key value. In addition, any tag changes in Habitat (such as adding, renaming, and deleting tags) will reflect automatically in Historian. No manual steps are required. If you disable this option, any tag changes in Habitat will be captured in the `<collector name>_Tag_Unconfirmed.xml` file. Only after you approve these changes *(on page)*, they are reflected in Historian.
Tag Deletion Type	Specify whether deleted tags in Habitat that you have approved must be deleted or disabled for data collection in Historian. Enter one of the following values:

Field	Description
	◦ DISABLE_TAG (this is the default value) ◦ DELETE_TAG
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

18. As needed, provide values in the the other sections common to all collectors *(on page 1298)*.
19. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

20. Start the collector *(on page 1356)*.

If you have disabled the automatic tag sync option in the configuration file, tag changes in Habitat (such as adding, renaming, and deleting tags) are captured in the `<collector_name>_tag.xml` file. You must approve the changes so that they are reflected in Historian. To do so:

1. Right-click the HAB collector instance that you have created, and then select **Confirm Queued Tags**.

   A list of tags that have been changed appears.

2. Select the check boxes corresponding to the tags whose changes you want to approve, and then select **Confirm**. You can filter the list using the **TAG TYPE** field.

   The tag changes are approved. The status of the tags is updated in the `<collector_name>_tag.xml` file (that is, the Confirmed parameter is set to true).

Collection Definitions of a HAB Collector

Table 31. Tag Data Collection Definition Parameters

Parameter	Description
DEFINITION NAME	The name of the collection definition. A value is required and must be unique. **Important:** You must not change the name after the collector starts collecting data. If, however, you want to change the name after the collector has started collecting data, refer to FAQs on HAB Collector *(on page)*.
STATUS	Indicates whether the collection definition is enabled. If an error occurs while processing the collection definition, the collector automatically disables the collection definition.
FAMILY	The name of the Habitat family from which you want to collect data (for example, EMS, DTS). A value is required and must be unique.
APPLICATION	The name of the Habitat application from which you want to collect data (for example, SCADA). A value is required.
DATABASE	The name of the Habitat database from which you want to collect data (for example, SCADAMOM). A value is required.
RECORD TYPE	The name of the HDB record from which you want to collect data (for example, ANALOG,POINT,COUNT). A value is required. Enter any record type that contains the composite key and MRID fields (because the collector uses these two fields to create tags).
COLLECTION TYPE	Indicates whether you want to perform polled or unsolicited data collection. • **Polled**: Indicates a periodic data collection, where data is collected at a regular time interval (indicated as PERIODIC in Habitat). • **Unsolicited**: Indicates that data is collected only when values have changed since the last time data was collected (indicated as EXCEPTION in Habitat).

Table 31. Tag Data Collection Definition Parameters (continued)

Parameter	Description
KEY	The value that will be used to filter tags for data collection. A value is required. You can use the wildcard character * to get a range of values. For example, if you want to collect data from all tags that begin with SUBSTN.LAKEVIEW, enter: SUBSTN.LAKEVIE*.*.*.*.*
PREFIX FIELD	The prefix that you want to use for tags. You can provide a different value for each collection definition, which helps you identify tags based on the collection definition.
TAG NAME FIELD	Determines how the tags created in Historian must be named. A value is required. For example, if you want the tags to be named after the value in the LOC_CIRCLG field, enter `LOC_CIRCLG`. When you do so, if the value in the LOC_CIRCLG field in Habitat is DOUGLAS, the tag created in Historian will be named <TagPrefix value>.<AlarmPrefix value>.DOUGLAS. You can enter multiple values separated by commas. For example, if you want the tags to be named after the values in the LOC_CIRCLG and PRIOR_CIRCLG fields, enter `LOC_CIRCLG,PRIOR_CIRCLG`. When you do so, if the values in the LOC_CIRCLG and PRIOR_CIRCLG fields are Douglas and 1 respectively, the tag created in Historian will be named <TagPrefix value>.<AlarmPrefix value>.DOUGLAS.1.
MRID FIELD	The MRID of the record. A value is required. If, however, MRID is not available, enter the composite key or any other unique identifier of the record.
DESCRIPTION FIELD	The description of the tag. A value is required.
VALUE FIELD	The name of the property that stores the tag value in Habitat. A value is required. You can enter multiple values, separated by commas. One Historian tag will be created for each value you enter in this field.

Table 31. Tag Data Collection Definition Parameters (continued)

Parameter	Description
TIMESTAMP FIELD	The name of the property that stores the timestamp of a tag in Habitat. You can use a HDB timestamp or custom/alias timestamps. **Examples:** For analog, you can use: • **FIELDTIME**: A combination of FLDTIME_ANALOG and FLDMSEC_ANALOG, in the hour: min:sec: millisec format. • **SCADATIME**: Used to capture SCTIME_ANALOG in the hour: min:sec: millisec format. • **SAMPLETIME**: The time at which the data sample was collected in Habitat in the hour: min:sec format. For point, you can use: • **FIELDTIME**: A combination of FLDTIME_POINT and FLDMSEC_POINT, in the hour: min:sec: millisec format. • **SCADATIME**: Used to capture SCTIME_POINT in the hour: min:sec: millisec format. • **SAMPLETIME**: The time at which the data sample was collected in Habitat in the hour: min:sec format. For count, you can use: • **FIELDTIME**: A combination of FLDTIME_COUNT and FLDMSEC_COUNT, in the hour: min:sec: millisec format. • **SAMPLETIME**: The time at which the data sample was collected in Habitat in the hour: min:sec format. You can edit the names of these custom/alias timestamps using the registry entries FieldTimeCustomFieldName, ScadaTimeCustomFieldName, and SampleTimeCustomFieldName respectively.
QUALITY FIELD	The name of the property that stores the tag quality in Habitat.
SAMPLE RATE	The rate at which you want to collect or poll data. A value is required.

Table 31. Tag Data Collection Definition Parameters (continued)

Parameter	Description
	For example, if the sample rate is 10 seconds: • For a polled collection type, data is written to Data Archiver every 10 seconds. • For an unsolicited collection type, the collector checks for any data changes every 10 seconds. Only if there are changes, the data is written to Data Archiver.
SAMPLE UNIT	The unit of measurement for the sample rate. A value is required. Valid values: • sec • min • hour • day • week • month
PERMANENT	Indicates whether you want to store the data in buffer files in Habitat in the event of a connection loss. We strongly recommend that you set this parameter to true to prevent loss of data.

Table 32. Alarm Data Collection Definition Parameters

Parameter	Description
DEFINITION NAME	The name of the collection definition. A value is required and must be unique. **Important:** You must not change the name after the collector starts collecting data. If, however, you want to change the name after the collector has started collecting data, refer to FAQs on HAB Collector *(on page)*.

Table 32. Alarm Data Collection Definition Parameters (continued)

Parameter	Description
STATUS	Indicates whether the collection definition is enabled. If an error occurs while processing the collection definition, the collector automatically disables the collection definition.
FAMILY	The name of the Habitat family from which you want to collect data (for example, EMS, DTS). A value is required and must be unique.
APPLICATION	The name of the Habitat application from which you want to collect data (for example, SCADA). A value is required.
DATABASE	The name of the Habitat database from which you want to collect data (for example, ALARMLIST). A value is required.
RECORD TYPE	The name of the HDB record from which you want to collect data (for example, CIRCLG, ALMQ). A value is required. Enter any record type that contains the composite key and MRID fields (because the collector uses these two fields to create tags).
KEY	This field is not applicable to alarms. Enter *.
TAG NAME FIELD	Determines how the tags created in Historian must be named. A value is required. For example, if you want the tags to be named after the value in the LOC_CIRCLG field, enter `LOC_CIRCLG`. When you do so, if the value in the LOC_CIRCLG field in Habitat is DOUGLAS, the tag created in Historian will be named <TagPrefix value>.<AlarmPrefix value>.DOUGLAS. You can enter multiple values separated by commas. For example, if you want the tags to be named after the values in the LOC_CIRCLG and PRIOR_CIRCLG fields, enter `LOC_CIRCLG,PRIOR_CIRCLG`. When you do so, if the values in the LOC_CIRCLG and PRIOR_CIRCLG fields are Douglas and 1 respectively, the tag created in Historian will be named <TagPrefix value>.<AlarmPrefix value>.DOUGLAS.1.

Table 32. Alarm Data Collection Definition Parameters (continued)

Parameter	Description
PREFIX	The prefix that you want to use for tags. A value is required. You can provide a different value for each collection definition, which helps you identify tags based on the collection definition.
VALUE	The name of the property that stores the tag value in Habitat. A value is required. You can enter multiple values, separated by commas (for example, `TEXT_CIRCLG, PRIOR_CIRCLG, TIME_CIRCLG`). The values will then be concatenated in the corresponding Historian tag.
TIMESTAMP	This field is not applicable to alarms. Leave the field blank. You can use the **VALUE FIELD** field to provide the timestamp (for example, TIME_CIRCLG).
QUALITY	This field is not applicable to alarms. Leave the field blank.
DISABLED	Switch the toggle to enable alarm filtering. You can then collect data only for the filtered alarms.
ALARM LOCATION	The alarm location based on which you want to filter alarm data. A value is required if alarm filtering is enabled. You can enter multiple values separated by commas (for example, LA,NY). The default value is *, which indicates that data for that parameter is not filtered.
ALARM AREA	The alarm area based on which you want to filter alarm data. A value is required if alarm filtering is enabled. You can enter multiple values separated by commas (for example, LAKEVIEW,RICHVIEW). The default value is *, which indicates that data for that parameter is not filtered.
ALARM CATEGORY	The alarm category based on which you want to filter alarm data. A value is required if alarm filtering is enabled. You can enter multiple values separated by commas (for example, PressureSensor,MotionSensor). The default value is *, which indicates that data for that parameter is not filtered.
ALARM PRIORITY	The alarm priority based on which you want to filter alarm data. A value is required if alarm filtering is enabled. You can enter multiple

Table 32. Alarm Data Collection Definition Parameters (continued)

Parameter	Description
	values separated by commas (for example, 1,2). The default value is *, which indicates that data for that parameter is not filtered.
ALARM EXCEPTION	The alarm exception based on which you want to filter alarm data. A value is required if alarm filtering is enabled. You can enter multiple values separated by commas. The default value is *, which indicates that data for that parameter is not filtered.
SAMPLE RATE	The rate at which you want to collect data. A value is required.
SAMPLE UNIT	The unit of measurement for the sample rate. A vaue is required. Valid values: • sec • min • hour • day • week • month
PERMANENT	Indicates whether you want to store the data in buffer files in Habitat in the event of a connection loss. We strongly recommend that you set this parameter to true to prevent loss of data.

About Adding an iFIX Collector Instance

This topic provides guidelines on how to configure the iFIX collector using Configuration Hub based on the running mode of iFIX. It also describes the collector behaviour and recommended configuration in each case.

iFIX Running Mode	Recommended Configuration for the iFIX Collector	Collector Behaviour After You Add the Collector Instance
iFIX is running in service mode and is secured. The iFIX Alarms and Events and the OPC Alarms and Events Servers are running as service.	Configure the iFIX collector services under a user account under which iFIX is running as a service. While adding an instance of the iFIX collector or the iFIX	• The iFIX collector starts running as a service. It appears in the collectors list in Configuration Hub.

iFIX Running Mode	Recommended Configuration for the iFIX Collector	Collector Behaviour After You Add the Collector Instance
	Alarms and Events collector using Configuration Hub, select **Service Under Specific User Account**.	• You can run the collector at a command prompt using the Collector Start action. A shortcut is created in the Windows Start menu so that you can run the collector in the command-line mode. • By default, when not started as an SCU task, the iFIX collector points to the iFIX nodename. You must configure the iFIX node in the **Collector Configuration** section in Historian Administrator.
iFIX is running as a service and is not secured. The iFIX Alarms and Events and the OPC Alarms and Events servers are running as service.	You can configure the iFIX collector service using a local system account or a specific user account.	• The iFIX collector starts running as a service. • You can run the collector at a command prompt using the Collector Start action. A shortcut is created in the Windows Start menu so that you can run the collector in the command-line mode. • By default, when not started as an SCU task, the iFIX collector points to the iFIX nodename. You must configure the iFIX node in the **Collector Configuration** section in Historian Administrator.

iFIX Running Mode	Recommended Configuration for the iFIX Collector	Collector Behaviour After You Add the Collector Instance
iFIX is not running as a service mode and is secured.	Configure the iFIX collector services under a user account that is added in the IFIXUSERS group. Do not configure as a local system service. While adding an instance of the iFIX collector or the iFIX Alarms and Events collector using Configuration Hub, select **Service Under Specific User Account**.	• Since Remote Collector Manager tries to start the collector as a service, and iFIX is not running as a service, an error message appears while adding a collector instance. However, the instance is configured successfully although it does not appear in the collectors list in Configuration Hub. • A shortcut is created in the Windows Start menu so that you can run the collector in the command-line mode, and the related registry folder is created. • You must start the collector manually for the first time using the shortcut. It will then connect to the Historian server, and it will then appear in the collectors list in Configuration Hub. • Once connected to server, you can start/stop it at a command prompt.
iFIX is not running as a service mode, and is not secured.	You can configure the iFIX collector service using a local system account or a specific user account.	• Since Remote Collector Manager tries to start the collector as a service, and iFIX is not running as a

iFIX Running Mode	Recommended Configuration for the iFIX Collector	Collector Behaviour After You Add the Collector Instance
		service, an error message appears while adding a collector instance. However, the instance is configured successfully. • A shortcut is created in the Windows Start menu so that you can run the collector in the command-line mode, and the related registry folder is created. • You must start the collector manually for the first time using the shortcut. It will then connect to the Historian server. • Once connected to server, you can start/stop it at a command prompt.
iFIX is not running.	You can configure the iFIX collector service using a local system account or a specific user account, as per the security configuration of iFIX.	• Since Remote Collector Manager tries to start the collector as a service, and iFIX is not running as a service, an error message appears while adding a collector instance. However, the instance is configured successfully although it does not appear in the collectors list in Configuration Hub. • A shortcut is created in the Windows Start menu so that you can run the

iFIX Running Mode	Recommended Configuration for the iFIX Collector	Collector Behaviour After You Add the Collector Instance
		collector in the command-line mode, and the related registry folder is created. • After you start iFIX, you must start the collector manually for the first time using the shortcut. It will then connect to the Historian server. • Once connected to server, you can start/stop it at a command prompt.

Add and Configure an iFIX Collector

Ensure that iFIX is running in a Windows-service mode. For more information, refer to About Adding an iFIX Collector Instance *(on page 1220)*.

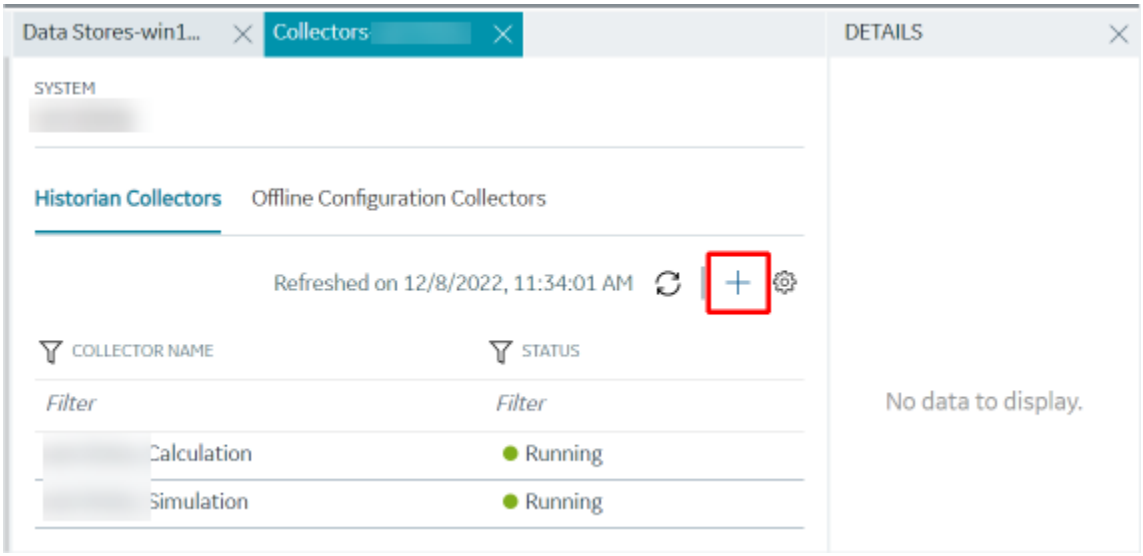
The iFIX collectors collect data from iFIX and store it in the Historian server. They include:

- The iFIX collector
- The iFIX Alarms and Events collector

When you install collectors, if iFIX is installed on the same machine as the collectors, instances of the iFIX collectors are created automatically. This topic describes how to create additional instances if needed.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **iFIX Alarms Events Collector** or **iFIX Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears. The **iFIX SERVER** field is disabled and populated.
7. Select **Next**.
   The **Destination Configuration** section appears. The **Historian Server** option is selected by default. You cannot select any other option for an iFIX Alarms and Events collector.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.
8. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

a. If you need to send data to a cloud destination, select the cloud destinations as needed.
   - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
   - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
   - **MQTT**- Select this if you need to send data to any of the following cloud destination.
     - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
     - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
     - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

b. If you need to send data to an on-premises Historian server, select **Historian Server**.
   If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.

9. Select **Next**.
10. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled. By default, this option is selected.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

    If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
    - iH Security Admins
    - iH Collector Admins
    - iH Tag Admins
11. Select **Next**.
    The **Collector Initiation** section appears.

12. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
13. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if iFIX is running in a secured mode, or if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter the credentials of the iFIX user in the **USERNAME** and **PASSWORD** fields.

      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

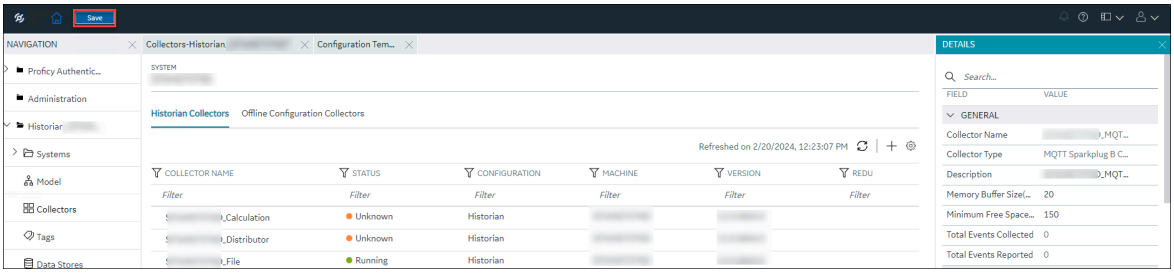
    You can also configure the collector to start automatically when you start iFIX.
14. Select **Add**.
    The collector instance is added, and appears in the Collectors list. A shortcut is created so that you can open it at a command prompt.
    If iFIX is not running in a service mode, an error message may appear. However, the collector instance is created; therefore, you can ignore the error message. Although the collector instance does not appear in the list of collectors in Configuration Hub, a shortcut is created. You can run the collector manually at a command prompt or as a SCU task. For more information, refer to About Adding an iFIX Collector Instance *(on page 1220)*.
15. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure the values as described in the following table.

Field	Description
Nodes to Browse	Enter the mask that you want to use to select tags when browsing for tags in the collector. The default value is FIX.

Field	Description
	If you want to browse for tags on other iFIX nodes via FIX networking, you can enter the other node name(s) here, separated by commas with no spaces. You must have the iFIX system configured for networking. For more information, refer to the iFIX product documentation on iFIX networking. **Note:** If you have modified iFIX node name, then you must also update the value in the **Nodes to Browse** field before browsing for tags in the iFIX collector. When you browse multiple nodes for tags to add to an iFIX collector, do not use space characters between node names or between the required comma and next node name. All characters after the space are ignored.
Tag Browse Criteria	Specify the tags for data collection *(on page 1077)*. **Note:** If you want to add block or field types to the list, edit the `FixTag.dat` file for Historian Administrator you are using. Refer to Editing FixTag.dat File *(on page)* for more information.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.

Field	Description
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

16. As needed, enter values in the other sections common o all collectors *(on page 1298)*.
17. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

18. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination. This option is not applicable to an iFIX Alarms and Events collector.

Add and Configure an MQTT Collector

1. Ensure that you have an MQTT broker.

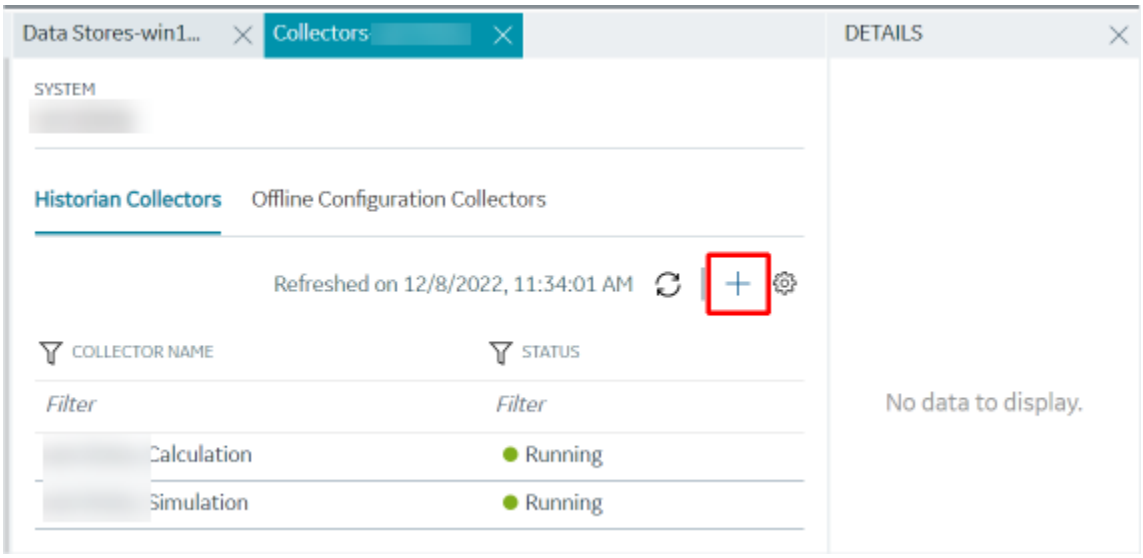
> **Note:**
> We have tested with the MQTT brokers Mosquitto 2.0.15 and HiveMQ-4.2.1. You can, however, use other MQTT brokers as well.

2. If you want to use username/password-based authentication or certificate-based authentication to connect the MQTT broker and the MQTT collector, configure the authentication in the MQTT broker.
3. If you want to use certificate-based authentication, ensure that the following files are available on your collector machine:
    - CA server root file
    - Private key file
    - Client certificate file

The MQTT collector collects data published to a topic using an MQTT broker. For more information, refer to Overview of the MQTT Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



   The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.
4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **MQTT Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.

6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter values as described in the following table.

Field	Description
MQTT BROKER ADDRESS	Enter the host name of the MQTT broker using which you want to collect data. A value is required.
MQTT BROKER PORT	Enter the port number of the MQTT broker. A value is required.
TOPIC	Enter the MQTT topic from which you want to collect data. A value is required. You can enter multiple topics separated by commas. If you want to use the Sparkplug B format, enter a value in the following format: `namespace/group_id/message_type/edge_node_id/device_id` where: ◦ `namespace` is the Sparkplug version. Enter `spBv1.0`. ◦ `group_id` is the ID of the group of nodes from which you want to collect data. ◦ `message_type` is the message type from which you want to collect data. The collector processes data only from NDATA and DDATA message types. ◦ `edge_node_id` is used to identify the MQTT EoN node within the infrastructure. ◦ `device_id` a device attached to the MQTT EoN node either physically or logically. You can use the wildcard character # for any of these parameters (except for namespace).
USERNAME	Enter the username to connect to the MQTT broker. A value is required if you have configured username/password-based authentication in the MQTT broker.
PASSWORD	Enter the password to connect to the MQTT broker. A value is required if you have configured username/password-based authentication in the MQTT broker.

Field	Description
CA SERVER ROOT FILE	Enter the path to the CA server root file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.
PRIVATE KEY FILE	Enter the path to the private key file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.
CLIENT CERTIFICATE FILE	Enter the path to the client certificate file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.
REQUESTED QUALITY OF SERVICE (QOS) LEVEL	Select the quality of service that you want to use while collecting data from an MQTT broker. ◦ **QoS 0**: Indicates that the message is delivered at most once or it is not delivered at all. ◦ **QoS 1**: Indicates that the message is always delivered at least once. ◦ **QoS 2**: Indicates that the message is delivered once. For more information, refer to https://www.hivemq.com/blog/mqtt-essentials-part-6-mqtt-quality-of-service-levels/.
MQTT VERSION	Select the version of the MQTT that you want to use.
CLEAN SESSION	Select one of the following options: ◦ **True**: Select this option if you do not want to create a new session when the MQTT broker and the collector are disconnected from each other. ◦ **False**: Select this option if you want to retain the session when the MQTT broker and the collector are disconnected from each other. This ensures that there is no loss of data. If you want to choose this option, ensure that you have selected **QoS 1** or **QoS 2** in the **REQUESTED QUALITY OF SERVICE (QOS) LEVEL** field.
SESSION EXPIRY INTERVAL	Enter the duration, in seconds, after which the data will be discarded when connection between the MQTT broker and collector is re-established.

Field	Description
	For example, if you enter 100 in this field, and if the MQTT broker and collector are disconnected for 90 seconds, the data is collected. If, however, the MQTT broker and the collector are disconnected for more than 100 seconds, the data will be discarded. This field is applicable only for MQTT V5 and only if you set the **CLEAN SESSION** field to **False**.
CONTENT TYPE	Select the format that you want to use for the payload: ◦ **JSON**: Select this option if you want to use the KairosDB format. ◦ **SparkPlug B v1.0**: Select this option if you want to use the Sparkplug format.

8. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.

9. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

   a. If you need to send data to a cloud destination, select the cloud destinations as needed.
      - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
      - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
      - **MQTT**- Select this if you need to send data to any of the following cloud destination.
        - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
        - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
        - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

   b. If you need to send data to an on-premises Historian server, select **Historian Server**.

If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
If the entered credentials are valid, a successful connection message appears.

10. Select **Next**.
    The **Collector Initiation** section appears.
11. If needed, modify the value in the **COLLECTOR NAME** field. The value must be unique, must contain the string `MQTT`, and must not contain a space.
    The value that you enter:
    - Must be unique.
    - Must contain the string `MQTT`.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
13. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.

14. In the **COLLECTOR SPECIFIC CONFIGURATION** and **INSTANCE CONFIGURATION** sections, configure the values as described in the following table.

COLLECTOR SPECIFIC CONFIGURATION

Field	Description
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

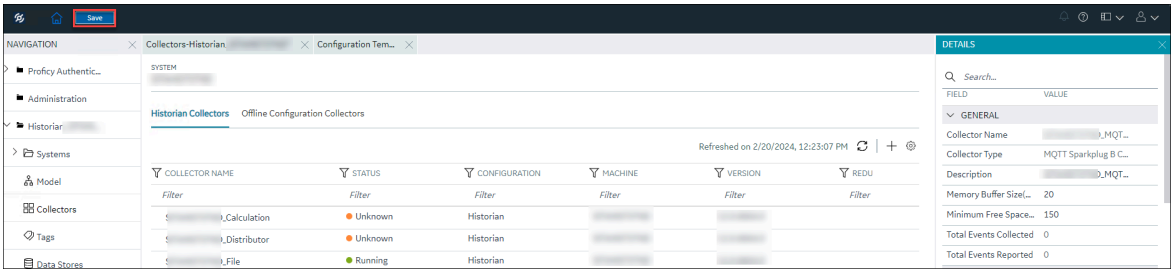
INSTANCE CONFIGURATION

Field	Description
MQTT Broker Address	Enter the host name of the MQTT broker using which you want to collect data. A value is required.
MQTT Broker Topic	Enter the MQTT topic from which you want to collect data. A value is required. You can enter multiple topics separated by commas. If you want to use the Sparkplug B format, enter a value in the following format: `namespace/group_id/message_type/edge_node_id/device_id` where: ◦ `namespace` is the Sparkplug version. Enter `spBv1.0`. ◦ `group_id` is the ID of the group of nodes from which you want to collect data. ◦ `message_type` is the message type from which you want to collect data. The collector processes data only from NDATA and DDATA message types.

Field	Description
	◦ `edge_node_id` is used to identify the MQTT EoN node within the infrastructure. ◦ `device_id` a device attached to the MQTT EoN node either physically or logically. You can use the wildcard character # for any of these parameters (except for namespace).
MQTT Brker Port	Enter the port number of the MQTT broker. A value is required.
Username	Enter the username to connect to the MQTT broker. A value is required if you have configured username/password-based authentication in the MQTT broker.
Password	Enter the password to connect to the MQTT broker. A value is required if you have configured username/password-based authentication in the MQTT broker.
CA Server Root File	Enter the path to the CA server root file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.
Private Key File	Enter the path to the private key file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.
CLIENT Certificate File	Enter the path to the client certificate file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.
Requested Quality Of Service (QoS) Level	Select the quality of service that you want to use while collecting data from an MQTT broker. ◦ **QoS 0**: Indicates that the message is delivered at most once or it is not delivered at all. ◦ **QoS 1**: Indicates that the message is always delivered at least once. ◦ **QoS 2**: Indicates that the message is delivered once. For more information, refer to https://www.hivemq.com/blog/mqtt-essentials-part-6-mqtt-quality-of-service-levels/.
MQTT Version	Select the version of the MQTT that you want to use.

Field	Description
CLEAN Session	Select one of the following options: ◦ **True**: Select this option if you do not want to create a new session when the MQTT broker and the collector are disconnected from each other. ◦ **False**: Select this option if you want to retain the session when the MQTT broker and the collector are disconnected from each other. This ensures that there is no loss of data. If you want to choose this option, ensure that you have selected **QoS 1** or **QoS 2** in the **REQUESTED QUALITY OF SERVICE (QOS) LEVEL** field.
SESSION Expiry Interval	Enter the duration, in seconds, after which the data will be discarded when connection between the MQTT broker and collector is re-established. For example, if you enter 100 in this field, and if the MQTT broker and collector are disconnected for 90 seconds, the data is collected. If, however, the MQTT broker and the collector are disconnected for more than 100 seconds, the data will be discarded. This field is applicable only for MQTT V5 and only if you set the **CLEAN SESSION** field to **False**.
Content Type	Select the format that you want to use for the payload: ◦ **JSON**: Select this option if you want to use the KairosDB format. ◦ **SparkPlug B v1.0**: Select this option if you want to use the Sparkplug format.

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

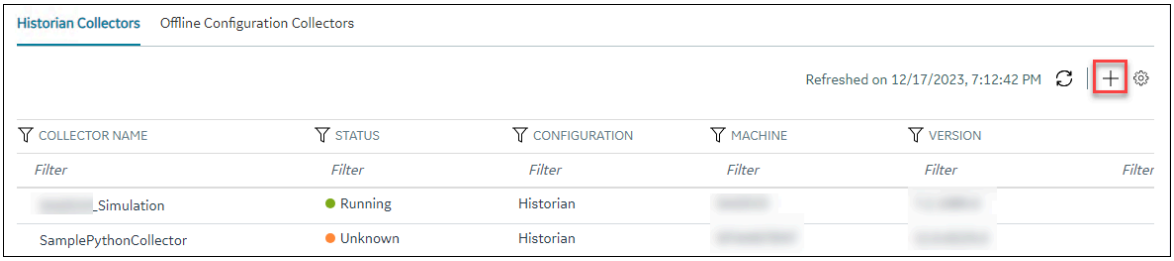
- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

Add an MQTT Sparkplug B Collector Instance using Configuration Hub

1. Install the Historian server *(on page)* and collectors *(on page)*.
2. Ensure that you have an MQTT broker.
3. If you want to use username/password-based authentication or certificate-based authentication to connect the MQTT broker and the MQTT Sparkplug B collector, configure the authentication in the MQTT broker.
4. If you want to use certificate-based authentication, ensure that the following files are available on your collector machine:
    - CA server root file
    - Private key file
    - Client certificate file

This topic describes how to add and configure an MQTT Sparkplug B collector instance using Configuration hub. You can also add and configure an MQTT Sparkplug B collector instance using RemoteCollectorConfigurator.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select  .



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **MQTT Sparkplug B Collector**, and then select **Get Details**.

> **Note:**
> The **INSTALLATION DRIVE** and **BASE DATA DIRECTORY** fields cannot be changed. This is the drive location and the data directory folder that you provided during Collectors installation.

The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are populated with the drive location and the data directory folder.

6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter the values as described in the following table:

Field	Description
BROKER CONFIGURATION	
BROKER ADDRESS	Enter the host name of the MQTT broker using which you want to collect data. A value is required.
BROKER PORT	Enter the port number of the MQTT broker. A value is required.
CLIENT ID	Enter the client ID of the MQTT Sparkplug B collector is running. This is required if you want to send the data to a cloud destination. If you do not have a client ID set up, by default, the interface name is taken.

Field	Description
PRIMARY HOST ID	Enter the unique host ID of the Collector. The Collector will publish the STATE message topic using this host ID and then the Publisher will subscribe and start publishing the topics to this host ID.
REORDER TIMEOUT	Enter the duration for waiting before sending a CMD message if a sequence is skipped. You can enter the duration in milliseconds.
MQTT VERSION	Select the version of the MQTT that you want to use. The following versions are supported: ◦ MQTT_V311 ◦ MQTT_V5

TOPIC: The parameters that need to be included in the topic:

```
Namespace/Groupname/<Message Type>/NodeID/<DeviceID>
```

You can also use wildcards in the **GROUP ID**, **EDGE NODE ID**, and **DEVICE ID** fields. The following wildcards are supported:

- **+** (single-level wildcard): Supported for all the three fields.
- **#** (Multi-level wildcard): Supported for the **EDGE NODE ID** and **DEVICE ID**

+ (Single-level wildcard): Can be used to subscribe to only one topic level. For example, if you subscribe to a topic `<Admin>/+/<ABC-123>`, you will receive messages from all the nodes corresponding to the group and device. That is,

```
<Admin>/Node1/<ABC-123>
<Admin>/Node2/<ABC-123>
<Admin>/Node3/<ABC-123>
...
<Admin>/Noden/<ABC-123>
```

(Multi-level wildcard): Can be used to subscribe to any number of levels within a topic. For example, if you subscribe to a topic `<Admin>/#`, you will receive messages from all the nodes and devices corresponding to the group,

Field	Description
<Admin>/Node1/<ABC-123> <Admin>/Node2/<ABC-123> <Admin>/Node3/<ABC-123> <Admin>/Node1/<ABC-124 <Admin>/Node2/<ABC-124> ... <Admin>/Noden/<Devicen>	
GROUP ID	Enter the Sparkplug B group name to which you want your collector to subscribe. If this is empty along with the other fields below **TOPIC**, the collector will subscribe to all the available groups, nodes, and devices.
EDGE NODE ID	Enter the Sparkplug B edge node ID to which you want your collector to subscribe. If this is empty, then the Collector will subscribe to all the edge nodes corresponding to the entered **GROUP ID**. If the **GROUP ID** and **DEVICE ID** are also empty, then the collector will subscribe to all the available groups, nodes and devices.
DEVICE ID	Enter the Sparkplug B device name. If this is empty, the collector subscribes to node messages if a **NODE ID** is entered, otherwise, if a **DEVICE ID** is entered, it subscribes to device messages.
TAG CONFIGURATION	
TAG NAME PREFIX FORMAT	
ELEMENT	Enter a prefix to be included in the tag. By using this field, you can clearly identify a tag. For example, you can clearly differentiate the tags that are collected. The following options are available:

Field	Description
	◦ **<interfacename>** ◦ **<groupid>** ◦ **<edgenodeid>** ◦ **<deviceid>** For example, if all four fields are provided and the interface/collector name is "sparkplug1" and the Topic contains group id = g1 edge node id = n1, device id = d1 then device tags will be created in Historian as “sparkplug1.g1.n1.d1.tag1”.
DELIMITER	Enter a delimiter you need to be included in the tag. You can use any special characters as delimiter. However, it is recommended that you use a delimiter that is ideal and clear to be identified. For example, "/", ".", "_". **Note:** "?" and "*" are not allowed.
PREVIEW	The preview of how the tags will be created and stored based on the **TAG PREFIX** and the **DELIMTER** that you selected.
TAG MASK	
TAGS TO ADD	Provide a mask along with wildcard to collect those tags that include the mask you provided and store in Historian. For example, *Pressure*. This will collect all the tags that begin with "Pressure". If you enter Pressure*, all the tags that end with "Pressure" will be collected. Similarly, if you enter *Pres?, all the tags that contain "pres" at the beginning will be collected. It can be "Pressure", "Press", or "Pres1".

Field	Description
	Note: Whenever a new tag is collected, the collector verifies the tag availability in the Historian and, if not present, adds the tag, then adds the data samples, streaming the data to the Historian server or a cloud destination.
TAGS TO EXCLUDE	Provide a mask along with wildcard to exclude those tags that include the mask you provided. For example, *Pressure*. This will exclude all the tags that begin with "Pressure". If you enter Pressure*, all the tags that end with "Pressure" will be excluded. Similarly, if you enter *Pres?, all the tags that contain "pres" at the beginning will be excluded. It can be "Pressure", "Press", or "Pres1".
AUTHENTICATION	
USER CREDENTIALS	
USERNAME	Enter the username to connect to the MQTT broker. A value is required if you have configured username/password-based authentication in the MQTT broker.
PASSWORD	Enter the password to connect to the MQTT broker. A value is required if you have configured username/password-based authentication in the MQTT broker.
SSL/TLS	
CA SERVER ROOT FILE	Enter the path to the CA server root file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.

Field	Description
PRIVATE KEY FILE	Enter the path to the private key file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.
CLIENT CERTIFICATE FILE	Enter the path to the client certificate file to connect to the MQTT broker. A value is required if you have configured certificate-based authentication in the MQTT broker.

8. Select **Next**.
   The **Destination Configuration** section appears.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.

9. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

   a. If you need to send data to a cloud destination, select the cloud destinations as needed.
      - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
      - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
      - **MQTT**- Select this if you need to send data to any of the following cloud destination.
        - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
        - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
        - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

   b. If you need to send data to an on-premises Historian server, select **Historian Server**.
      If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.

If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
If the entered credentials are valid, a successful connection message appears.

10. After you selected the destination, select **Next**.
    The **Collector Initiation** section appears.
11. If needed, modify the value in the **COLLECTOR NAME** field.

> **Note:**
> If you will be using the collector in Historian Administrator, the **COLLECTOR NAME** must include Sparkplug B in it.

    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
13. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
14. If needed, enter values in available fields *(on page 1298)*.

15. In the upper-left corner of the page, select **Save**.
16. If needed, restart the collector.

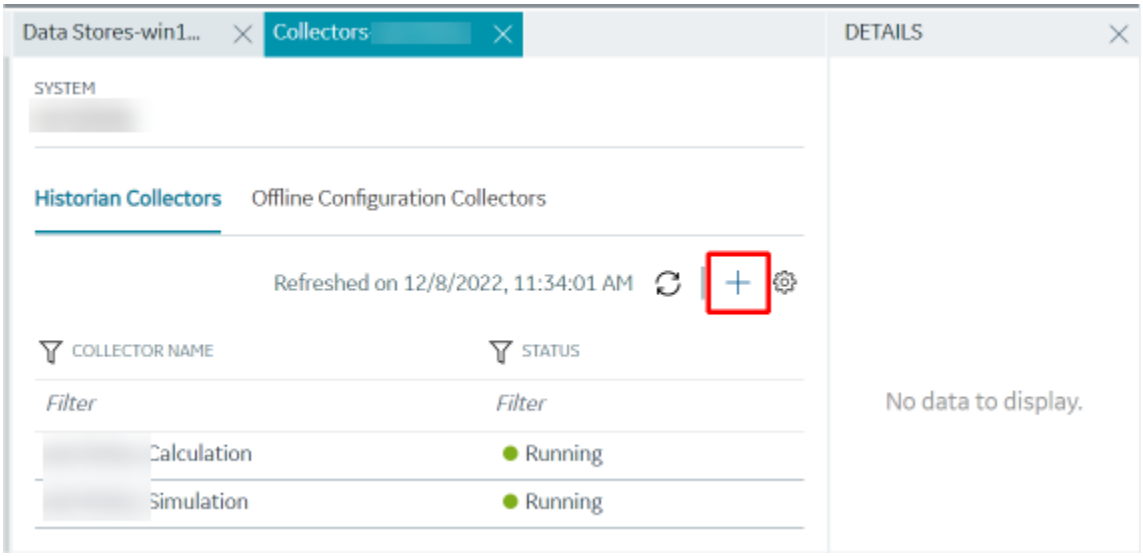
- Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,
  - If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
  - If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.
- If needed, you can configure the collector instance *(on page)*.

Add and Configure an ODBC Collector Using Configuration Hub

The ODBC collector collects data from an application based on an ODBC driver. For more information, refer to Overview of the ODBC Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **ODBC Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter values as described in the following table.

Field	Description
ODBC SERVER	Enter the host name or IP address of the ODBC server from which you want to collect data. A value is required.
USERNAME	Enter the username to connect to the ODBC server. A value is required.
PASSWORD	Enter the password to connect to the ODBC server. A value is required.

8. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.

9. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

    a. If you need to send data to a cloud destination, select the cloud destinations as needed.
        - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
        - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
        - **MQTT**- Select this if you need to send data to any of the following cloud destination.
            - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
            - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
            - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

    b. If you need to send data to an on-premises Historian server, select **Historian Server**.
    If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
    If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
    If the entered credentials are valid, a successful connection message appears.

10. Select **Next**.
    The **Collector Initiation** section appears.
11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
        - Must be unique.
        - Must contain the string `ODBC`.
        - Must not exceed 15 characters.
        - Must not contain a space.
        - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.

- **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
- **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

  If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
  - iH Security Admins
  - iH Collector Admins
  - iH Tag Admins

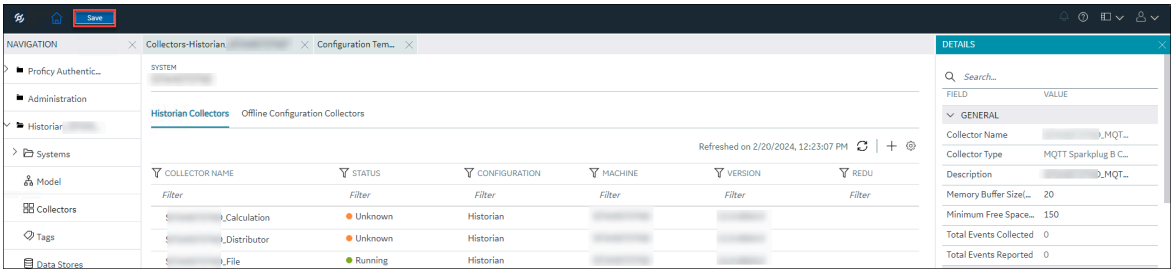
You can also configure the collector to start automatically when you start the computer.

13. Select **Add**.
    The collector instance is added. The fields specific to the collector appear in the **DETAILS** section.
14. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
Recovery Time (hours)	Enter the maximum time, in hours, for which the collector will attempt to recover data after the collector is started or when connection between the collector and the ODBC server is re-established. This time is calculated as the duration between the current time and the last known write time. Continuous data collection is resumed only after the previous data has been recovered. By default, this value is set to 0, which means data recovery is not attempted. The maximum value you can provide is 168 hours (that is, 7 days).
Throttle (Milliseconds)	Enter the frequency, in milliseconds, at which you want the ODBC collector to query the ODBC

Field	Description
	server for tag data. This will minimize the load on the ODBC server. You can enter a value up to 16 hours. **Note:** If this field is blank, enter the required minimum value of 100 milliseconds.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: *<installation folder of*

Historian>\GE Digital\<*collector name*>. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

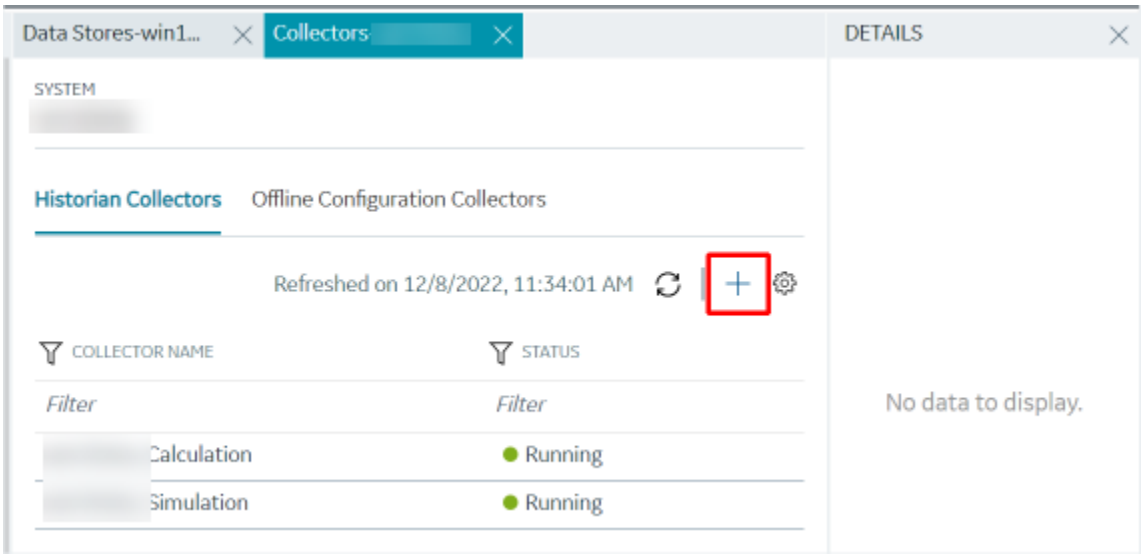
Add and Configure an OPC Classic Alarms and Events Collector

The OPC Classic Alarms and Events collector collects alarms and events data from any OPC 1.0 or OPC 2.0 compliant OPC server.

You can create an OPC Alarms and Events collector only for an on-premises Historian server, not for a cloud destination.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **OPC Alarms and Events Collector**, and then select **Get Details**.

The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.

6. Select **Next**.
   The **Source Configuration** section appears.
7. In the **OPC A&E SERVER** field, enter the host name or IP address of the OPC server from which you want to collect alarms and events data.
8. Select **Next**.
   The **Destination Configuration** section appears. Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default; the other options are disabled. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the value you selected in the **MACHINE NAME** field in the **Collector Selection** section.
9. If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
10. Select **Next**.
    The **Collector Initiation** section appears.
11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

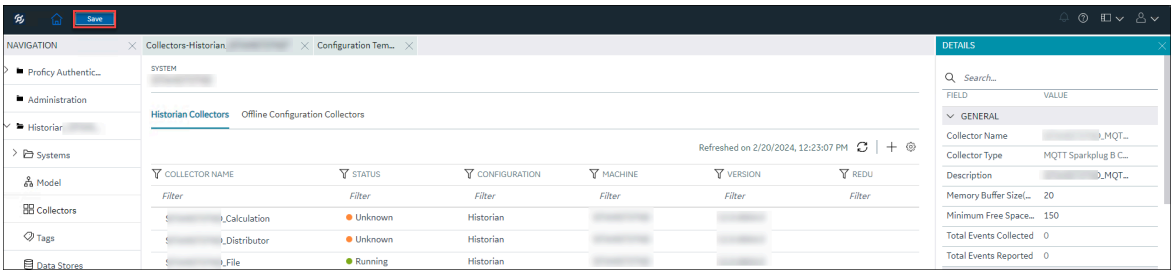
      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

You can also configure the collector to start automatically when you start the computer.

13. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
14. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure the values as described in the following table.

Field	Description
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



    The changes to the collector instance are saved.
17. If needed, restart the collector.

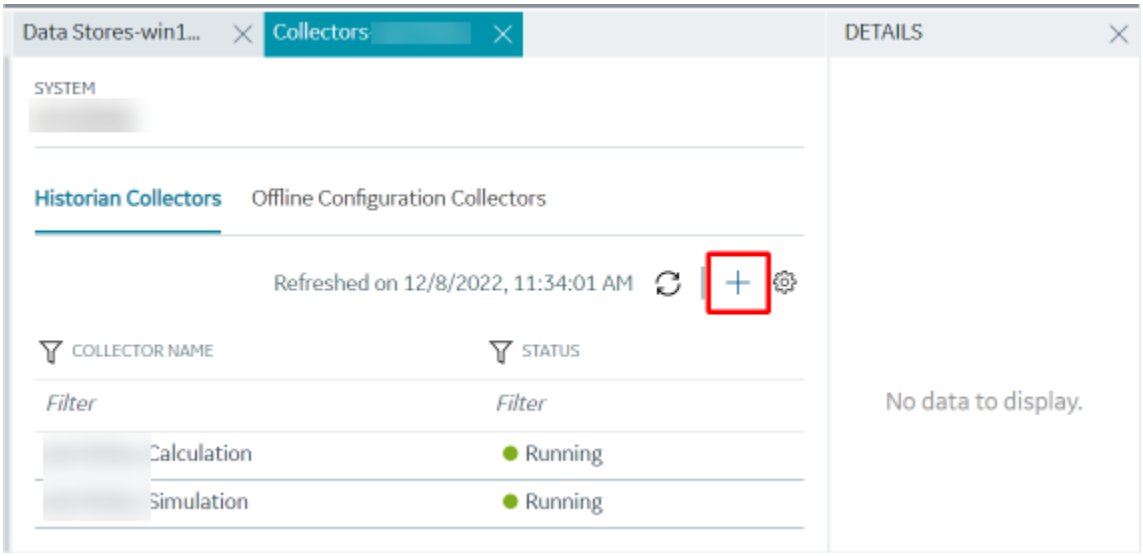
Specify the tags *(on page 1077)* whose data you want to collect using the collector.

Add and Configure an OPC Classic Data Access Collector

The OPC Classic Data Access (DA) collector collects data from any OPC 1.0 or OPC 2.0 compliant OPC Classic server. For more information, refer to Overview of the OPC Classic DA Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



   The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.
4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **OPC Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter values as described in the following table.

Field	Description
OPC SERVER	Select the machine on which you have installed the OPC Classic DA server from which you want to collect data.

Field	Description
MACHINE NAME	Enter the host name or IP address of the OPC server. This field appears only if you have selected a remote OPC server. A value is required.
OPC DA SERVER PROG ID	Enter the prog ID of the OPC server. This field appears only if you have selected a remote OPC server. A value is required.

8. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.

9. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

   a. If you need to send data to a cloud destination, select the cloud destinations as needed.
      - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
      - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
      - **MQTT**- Select this if you need to send data to any of the following cloud destination.
        - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
        - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
        - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

   b. If you need to send data to an on-premises Historian server, select **Historian Server**.
      If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.

If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
If the entered credentials are valid, a successful connection message appears.

10. Select **Next**.
    The **Collector Initiation** section appears. The **COLLECTOR NAME** field is populated with a value in the following format: `<system name>_OPC_<OPC server name>`
11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

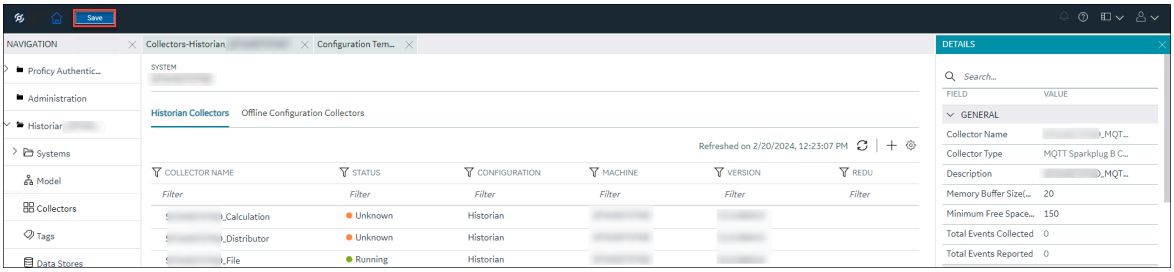
      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
13. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
14. Under **COLLECTOR SPECIFIC CONFIGURATION**, configure values as described in the following table.

Field	Description
OPC Server Prog ID	The program ID of the OPC server from which you want to collect data.
Read Mode	The read mode that you want the collector to use. For information, refer to the documentation of the OPC server that you are using or the OPC specification on the OPC Foundation website.
First Browse Criteria	A comma-separated first-level search criterion for browsing tags from the data source. The top-level and second-level criteria are used together by the AND operation to browse tags. For example, if you enter `USGB014` in the **First Browse Criteria** field and `F_CV, B_CUALM` in the **Second Browse Criteria** field, it returns all the tags that contain: ◦ USGB014 -and- ◦ F_CV or B_CUALM
Second Browse Criteria	A comma-separated second-level search criterion for browsing tags from the data source. The top-level and second-level criteria are used together by the AND operation to browse tags.
Threading Model	The type of the threading model selected for the collector. The model selected must match the threading model of the OPC server. ◦ **Multithreaded**: Select this option for better performance. We recommend that you configure your collector to use the default multi-threading model. ◦ **Apparent**: Select this option for best compatibility. Some OPC servers do not work well with multi-threading. If you experience problems running your collector with multi-threading, use the apartment model.

Field	Description
	The default setting is multi-threaded. For information, refer to the documentation of the OPC server you are using.
Configuration Changes	Indicates whether the collector configuration changes are processed in real time or after restarting the collector. ◦ **Made On-Line**: Select this option to process any configuration changes immediately (after 30 seconds) after you select the **Update** button. **Note:** ▪ Some OPC servers cannot handle processing configuration changes online. If you experience any instability with changes made online, use the next option. ◦ **Made After Collector Restart**: Select this option to hold all configuration changes until you manually restart the collector.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

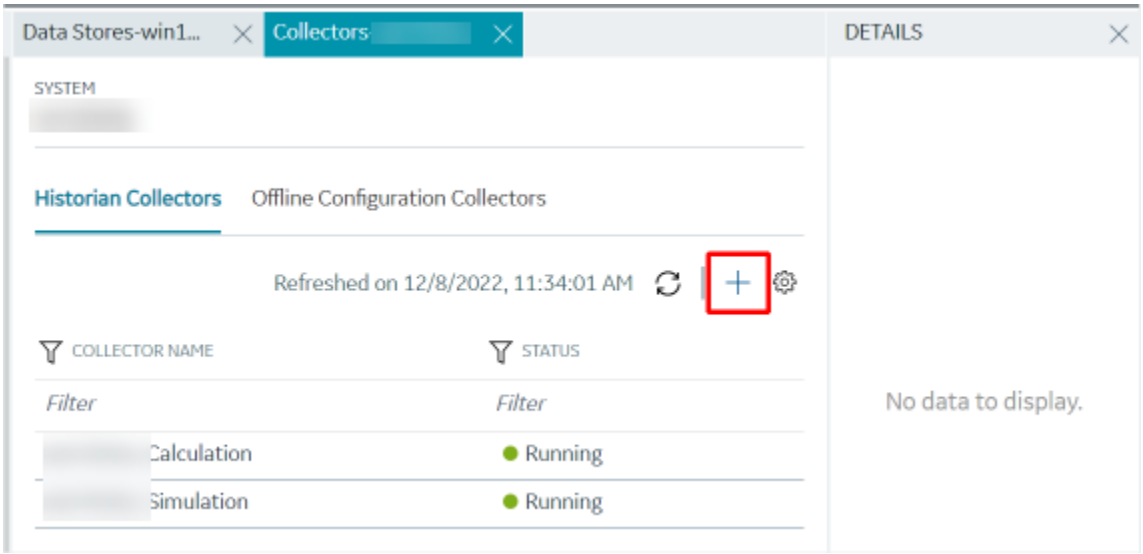
- If you have selected **Historian Configuration**, specify the tags for data collection *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

Add and Configure an OPC Classic HDA Collector

The OPC Classic Historical Data Access (HDA) collector collects data from any OPC HDA 1.2 - compliant OPC Classic HDA server. For more information, refer to Configure the OPC Classic HDA Collector Using Historian Administrator *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **OPC HDA Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter values as described in the following table.

Field	Description
OPC HDA SERVER	Select the machine on which you have installed the OPC Classic HDA server from which you want to collect data.
MACHINE NAME	Enter the host name or IP address of the OPC server. This field appears only if you have selected a remote OPC server. A value is required.
OPC DA SERVER PROG ID	Enter the prog ID of the OPC server. This field appears only if you have selected a remote OPC server. A value is required.

8. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.
9. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

a. If you need to send data to a cloud destination, select the cloud destinations as needed.
   - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
   - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
   - **MQTT**- Select this if you need to send data to any of the following cloud destination.
     - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
     - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
     - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

b. If you need to send data to an on-premises Historian server, select **Historian Server**.
   If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.

10. Select **Next**.
    The **Collector Initiation** section appears.
11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must contain the string `OPCHDA`.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default, this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:

- iH Security Admins
- iH Collector Admins
- iH Tag Admins

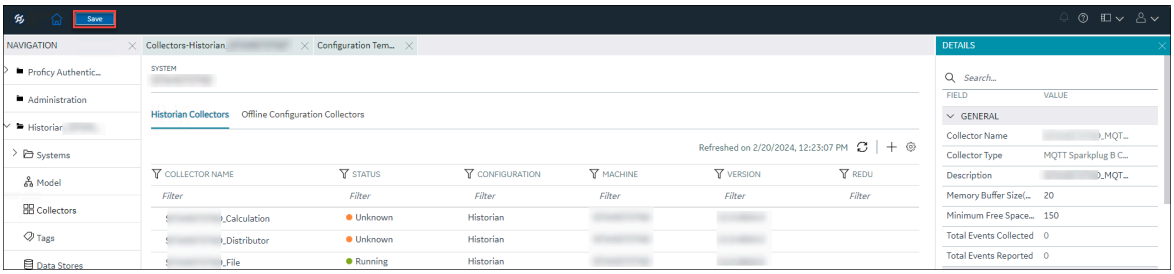
You can also configure the collector to start automatically when you start the computer.

13. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
14. As needed, under **COLLECTOR SPECIFIC CONFIGURATION**, configure values as described in the following table.

Field	Description
Recovery Time	It indicates the maximum time, in hours, for which the collector will attempt to recover data after the collector is started or when connection between the collector and the OPC server is re-established. This time is calculated as the duration between the current time and the last known write time. Continuous data collection is resumed only after the previous data has been recovered. You can enter a value between 1 and 150.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.

16. In the upper-left corner of the page, select **Save**.



    The changes to the collector instance are saved.
17. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

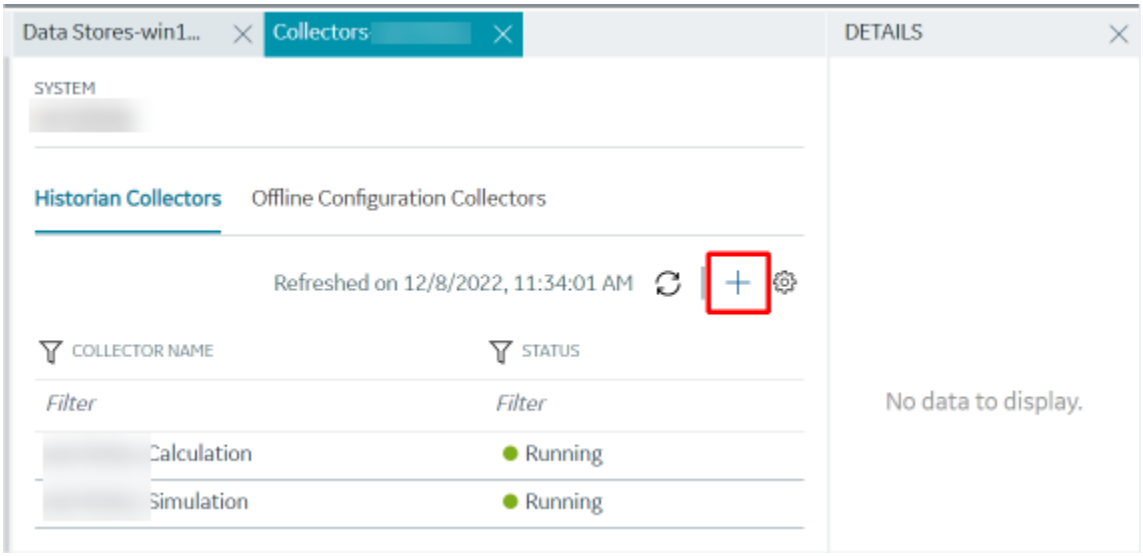
- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

Add and Configure an OPC UA Data Access Collector

The OPC UA Data Access (DA) collector gathers and collects data from a OPC UA 1.0-compliant OPC UA DA server. For more information, refer to Configure an OPC UA DA Collector Using Historian Administrator *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **OPC UA DA Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. In the **OPC UA SERVER URI** field, enter the URI to connect to the OPC server in the following format:
   `opc.tcp://<host name or IP address of the OPC UA server>:<port number>`
8. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.
9. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

a. If you need to send data to a cloud destination, select the cloud destinations as needed.
   - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
   - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
   - **MQTT**- Select this if you need to send data to any of the following cloud destination.
     - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
     - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
     - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

b. If you need to send data to an on-premises Historian server, select **Historian Server**.
   If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.

10. Select **Next**.
    The **Collector Initiation** section appears. The **COLLECTOR NAME** field is populated with a value in the following format: `<Historian server name>_OPCUACollector_<number>`
11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must contain the string `OPCUACollector`.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:

- iH Security Admins
- iH Collector Admins
- iH Tag Admins

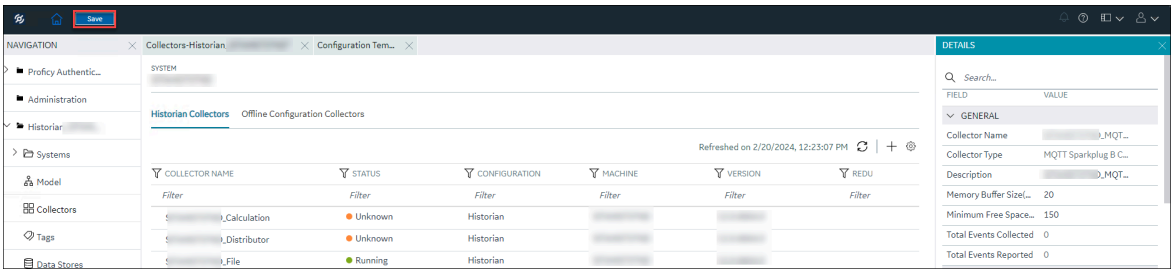
You can also configure the collector to start automatically when you start the computer.

13. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
14. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
OPC UA Server URL	The URI to connect to the OPC UA server. Enter a value in the following format: `opc.tcp://<host name or IP address of the OPC UA server>:<port number>`
Secured Connectivity	Indicates whether you want a secured connection between the OPC UA server and the collector. By default, this field is set to false. You can establish a secured connectivity in one of the following ways: ◦ **Using certificates:** To use certificates, switch off the **User Security** toggle. ◦ **Using user authentication:** To use user authentication, switch on the **User Security** toggle.
User Security	This field is enabled only if you have enabled secured connectivity. Switch on this toggle if you want to use user authentication to connect to the OPC server. When you do so, the **User Name** and **Password** fields are enabled. You can either enter the user credentials in these fields, or you can use the values in the `ClientConfig.ini` file. For instructions, refer to Connect with the OPC UA DA Server Securely *(on page)*.

Field	Description
Username	This field is enabled only if you have set the secured connectivity to true and switched on the **User Security** toggle. Enter the username that you want to use to connect to the OPC server. If you do not provide a value, the username from the `ClientConfig.ini` file is considered.
Password	This field id enabled only if you have set the secured connectivity to true and selected the **Enable User Security** check box. Enter the password that you want to use to connect to the OPC server. If you do not provide a value, the password from the `ClientConfig.ini` file is considered.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

If you have enabled secured connection, establish a secured connection between the OPC server and the collector *(on page)*.

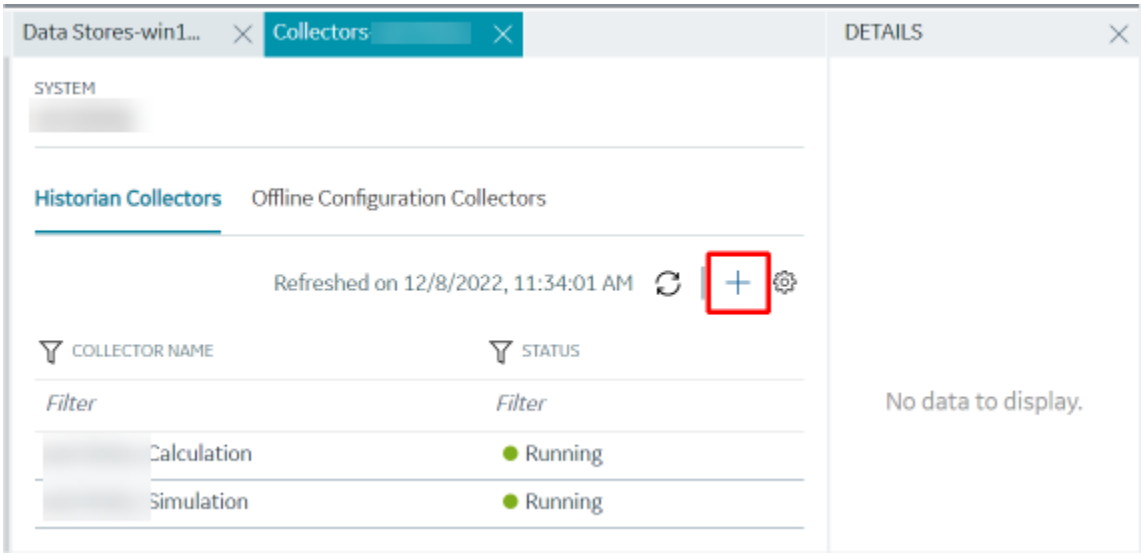
Add and Configure an OSI PI Collector

Install PI AF SDK version 2.7.5 or later.

The OSI PI collector collects data from an OSI PI server. For more information, refer to Overview of the OSI PI Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



   The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.
4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **OSI PI Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter values as described in the following table.

Field	Description
PI SERVER	Enter the host name or IP address of the OSI PI server from which you want to collect data. A value is required.
PI USERNAME	Enter the username to connect to the OSI PI server.
PI PASSWORD	Enter the password to connect to the OSI PI server.

8. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.

9. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

   a. If you need to send data to a cloud destination, select the cloud destinations as needed.
      - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
      - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
      - **MQTT**- Select this if you need to send data to any of the following cloud destination.
        - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
        - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
        - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

   b. If you need to send data to an on-premises Historian server, select **Historian Server**.
      If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.

If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
If the entered credentials are valid, a successful connection message appears.

10. Select **Next**.
    The **Collector Initiation** section appears. The **COLLECTOR NAME** field is populated with a value in the following format: `<host name or IP address of the PI server>_PICollector`
11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default, this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

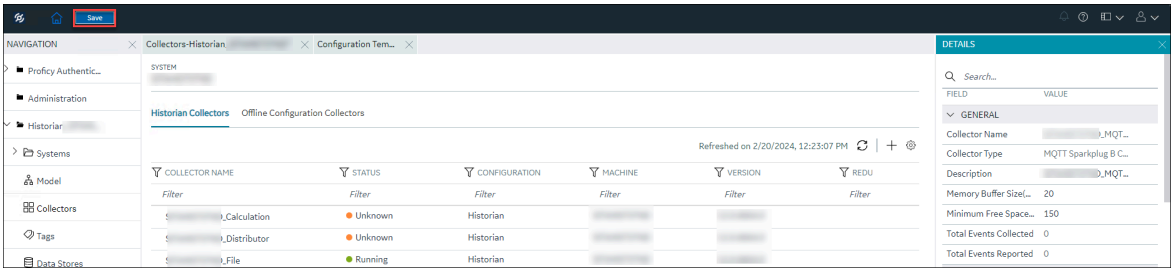
      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
13. Select **Add**.
    The collector instance is added. The fields specific to the collector appear in the **DETAILS** section.
14. In the **COLLECTOR SPECIFIC CONFIGURATION** sections, configure values in the following table.

Field	Description
Max Recovery Time (hours)	Enter the maximum time, in hours, for which the collector will attempt to recover data after the collector is started or when connection be-

Field	Description
	tween the collector and the OSI PI server is re-established. This time is calculated as the duration between the current time and the last known write time. Continuous data collection is resumed only after the previous data has been recovered. The default value is 4 hours.
Data Source	Specify whether you want to collect data from PI archive or PI snapshot: ◦ **Archive**: Stores timeseries-based data. ◦ **Snapshot**: Stores the most recent values of tags.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

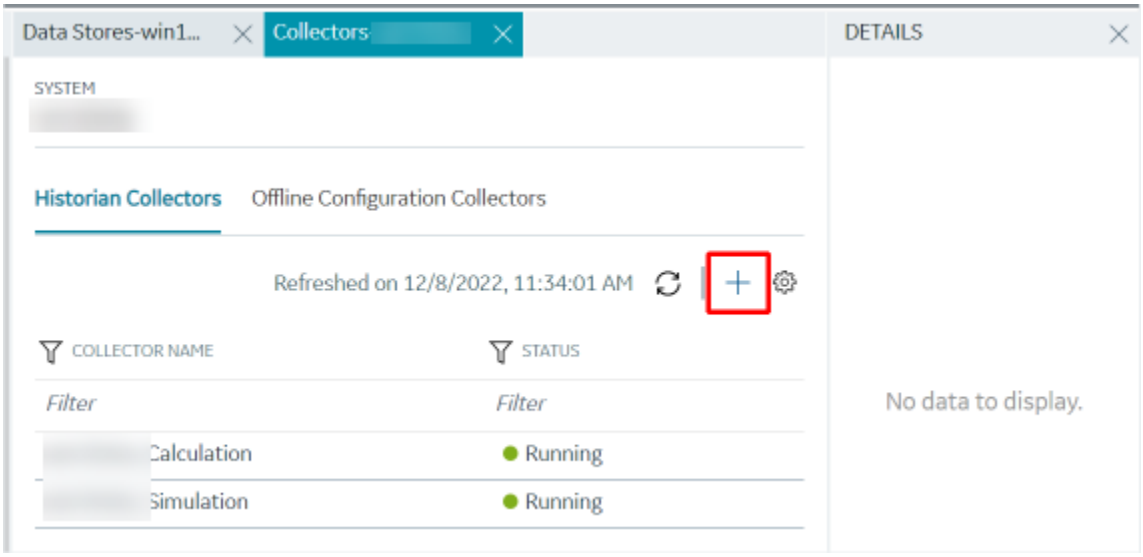
Add and Configure an OSI PI Distributor

Install PI AF SDK version 2.7.5 or later.

An OSI PI distributor collects data from a Historian server and sends it to an OSI PI server. For more information, refer to Overview of the OSI PI Distributor *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **OSI PI Distributor Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. Enter values as described in the following table.

Field	Description
HISTORIAN SOURCE SERVER	Enter the host name or IP address of the Historian server from which you want to collect data. A value is required.
USERNAME	Enter the username to connect to the Historian server. A value is required.
PASSWORD	Enter the password to connect to the Historian server. A value is required.

8. Select **Next**.
   The **Destination Configuration** section appears. Under **CHOOSE DESTINATION**, the **PI Server** option is selected by default; the other options are disabled.
9. Enter values as described in the following table.

Field	Description
PI SERVER	Enter the host name or IP address of the OSI PI server to which you want to send data. A value is required.
PI USERNAME	Enter the username to connect to the OSI PI server.
PI PASSWORD	Enter the password to connect to the OSI PI server.

10. Select **Next**.
    The **Collector Initiation** section appears.

11. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default, this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

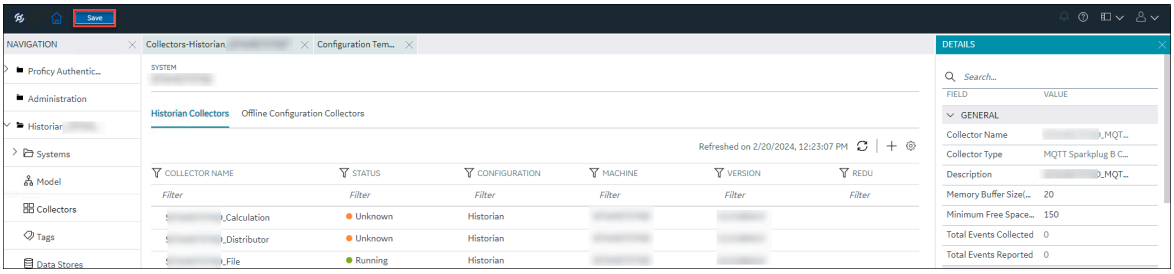
      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
13. Select **Add**.
    The collector instance is added. The fields specific to the collector instance appear in the **DETAILS** section.
14. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values in the following table.

Field	Description
Max Recovery Time (hours)	Enter the maximum time, in hours, for which the collector will attempt to recover data after the collector is started or when connection between the collector and the OSI PI server is re-established. This time is calculated as the duration between the current time and the last known write time. Continuous data collection is resumed only after the previous data has been recovered.

Field	Description
	The default value is 4 hours.
Data Source	Specify whether you want to collect data from PI archive or PI snapshot: ◦ **Archive**: Stores timeseries-based data. ◦ **Snapshot**: Stores the most recent values of tags.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

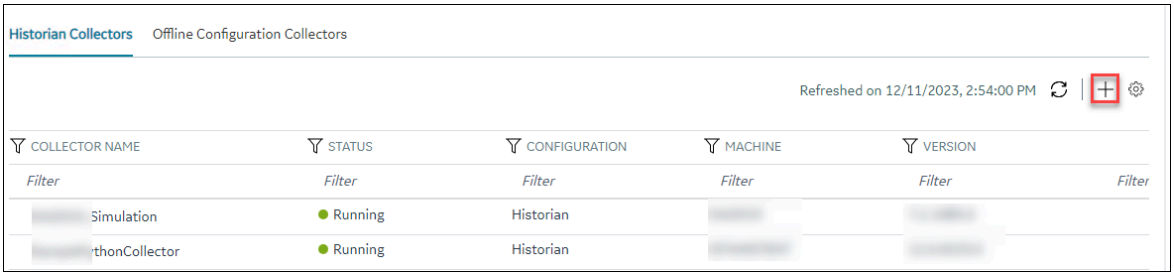
Specify the tags *(on page 1077)* whose data you want to collect using the collector.

Add a Python Collector Instance using Configuration Hub

Install the Python Collector *(on page)*

This topic describes how to add a Python collector instance using Configuration hub.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



   The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.
4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Python Collector**, and then select **Get Details**.

> **Note:**
> The **INSTALLATION DRIVE** and **BASE DATA DIRECTORY** fields cannot be changed. This is the drive location and the data directory folder that you provided during Collectors installation.

   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are populated with the drive location and the data directory folder.
6. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.
7. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

a. If you need to send data to a cloud destination, select the cloud destinations as needed.
   - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
   - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
   - **MQTT**- Select this if you need to send data to any of the following cloud destination.
     - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
     - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
     - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

b. If you need to send data to an on-premises Historian server, select **Historian Server**.
   If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.

8. After you selected the destination, select **Next**.
   The **Collector Initiation** section appears.
9. If needed, modify the value in the **COLLECTOR NAME** field.
   The value that you enter:
   - Must be unique.
   - Must not exceed 15 characters.
   - Must not contain a space.
   - Must not contain special characters except a hyphen, period, and an underscore.
10. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:

- iH Security Admins
- iH Collector Admins
- iH Tag Admins

You can also configure the collector to start automatically when you start the computer.

11. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.

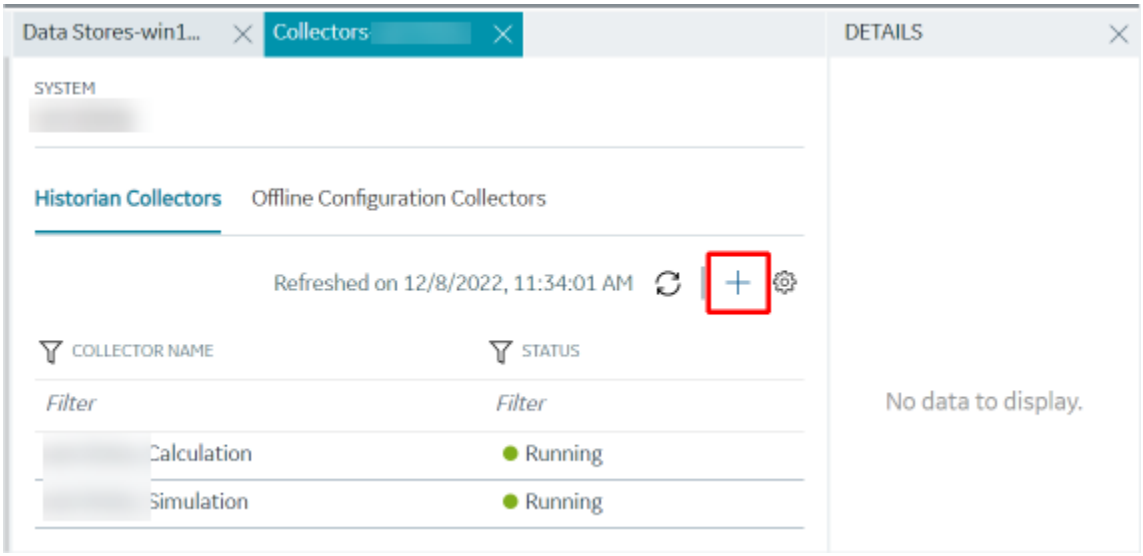
Specify the tags *(on page 1077)* whose data you want to collect using the collector.

Add and Configure a Server-to-Server Collector

The Server-to-Server collector collects data and messages from a source Historian server to a destination Historian server or a cloud destination. For more information, refer to Overview of the Server-to-Server Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Server to Server Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. In the **HISTORIAN SOURCE SERVER** field, enter the host name or IP address of the Historian server from which you want to collect data. By default, the local host name appears.
8. If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.
9. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is populated with the collector machine name, you can change it in case of a remote Historian server.

10. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

    a. If you need to send data to a cloud destination, select the cloud destinations as needed.
        - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
        - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
        - **MQTT**- Select this if you need to send data to any of the following cloud destination.
            - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
            - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
            - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

    b. If you need to send data to an on-premises Historian server, select **Historian Server**.
    If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD**.
    If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**.
    If the entered credentials are valid, a successful connection message appears.

11. Select **Next**.
    The **Collector Initiation** section appears.
12. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
13. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:

- iH Security Admins
- iH Collector Admins
- iH Tag Admins

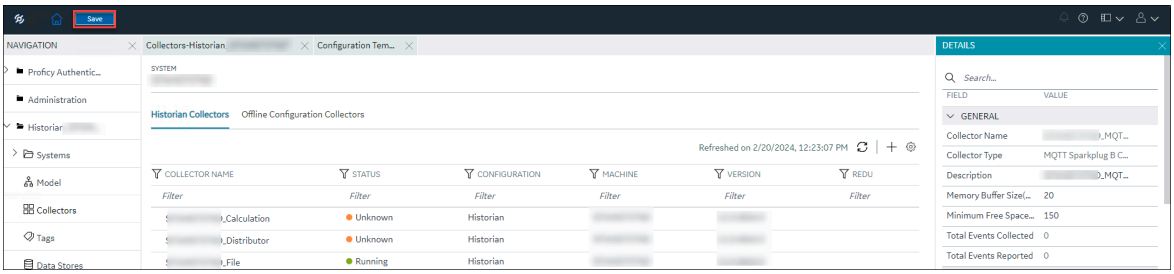
You can also configure the collector to start automatically when you start the computer.

14. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
15. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
Alarm Replication	Indicates whether you want to enable or disable alarm replication. If you enable alarm replication, all collected alarm data will be transferred from the source server to the destination server. If you enable alarm replication, you also enable alarm recovery. However, if you set the **Max Recovery Time** value to zero, alarm recovery does not happen.
Message Replication	Indicates whether you to want to enable or disable message replication. If you enable message replication, messages will be transferred from the source server to the destination server. You can use this data for audits. If you enable message replication, you also enable message recovery. However, if you set the **Max Recovery Time** value to zero, message recovery does not happen.
Calculation Timeout (sec)	The maximum time allowed for a tag's calculation formula to execute before being terminated. The default value is 10 seconds.
Max Recovery Time (hr)	The maximum duration, in hours, for which the collector will attempt to restore data during recovery logic. The default value is 4 hours.
Add Prefix to Messages	The prefix to identify replicated messages on the destination. Alarms and events data will automatically have a prefix added to it with the following syntax: `MachineName_Datasource`

Field	Description
	For example, if your alarm is forwarded from the server `Almserver12` with a data source named `OPCAE`, the prefix will be `Almserver12_OPCAE`.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

16. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
17. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

18. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

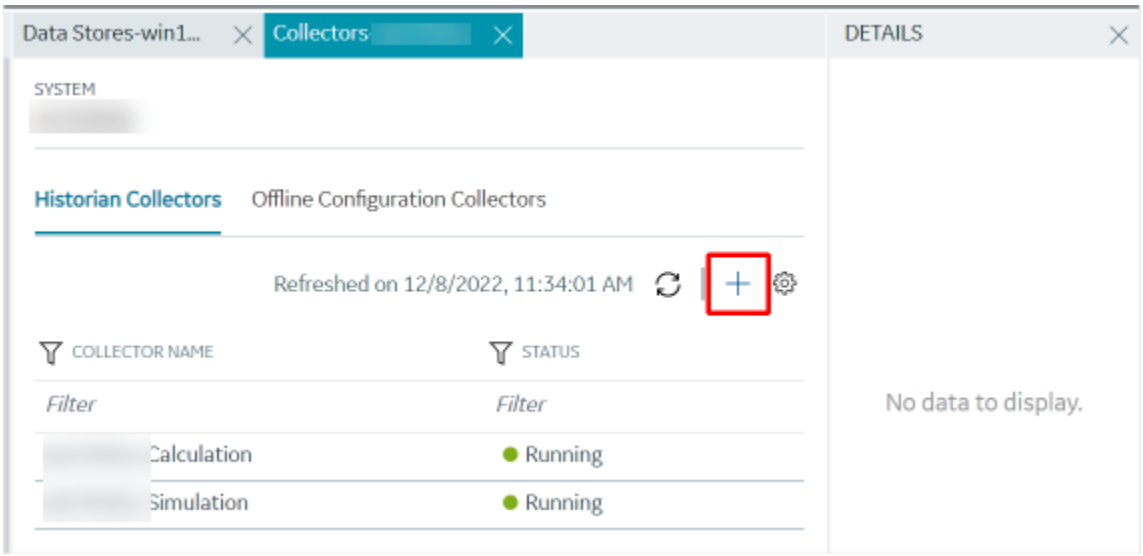
Add and Configure a Server-to-Server Distributor

The Server-to-Server distributor is used to send data from a smaller Historian server to a larger, centralized on-premises Historian server. For more information, refer to Overview of the Server-to-Server

Distributor *(on page)*. If you want to send data to a cloud destination, use the Server-to-Server collector *(on page 1278)* instead.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



   The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.
4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Server to Server Distributor Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears.
7. In the **HISTORIAN SOURCE SERVER** field, enter the host name or IP address of the Historian server from which you want to collect data. By default, the local host name appears.

8. If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.
9. Select **Next**.
   The **Destination Configuration** section appears. Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default; the other options are disabled. In addition, the **DESTINATION HISTORIAN SERVER** field is populated with the collector machine name, you can change it in case of a remote Historian server.
10. In the **USERNAME** and **PASSWORD** fields, enter the credentials to access the destination Historian server. Values are required only for a remote Historian server.
    If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered is valid.
11. Select **Next**.
    The **Collector Initiation** section appears.
12. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
13. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:

- iH Security Admins
- iH Collector Admins
- iH Tag Admins

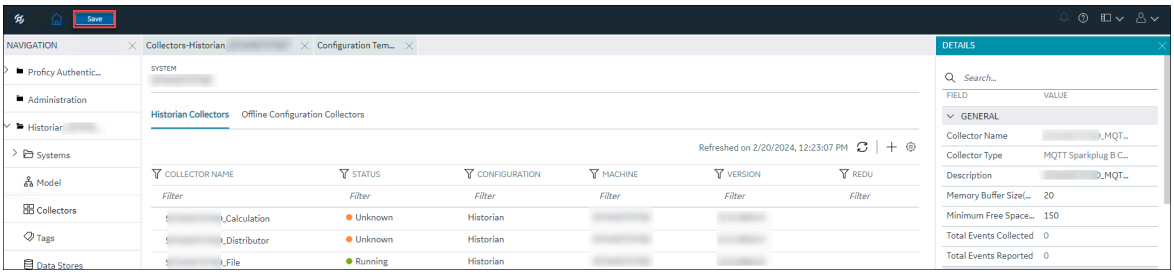
You can also configure the collector to start automatically when you start the computer.

14. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
15. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
Alarm Replication	Indicates whether you want to enable or disable alarm replication. If you enable alarm replication, all collected alarm data will be transferred from the source server to the destination server. If you enable alarm replication, you also enable alarm recovery. However, if you set the **Max Recovery Time** value to zero, alarm recovery does not happen.
Message Replication	Indicates whether you to want to enable or disable message replication. If you enable message replication, you also enable message recovery. However, if you set the **Max Recovery Time** value to zero, message recovery does not happen.
Calculation Timeout (sec)	The maximum time allowed for a tag's calculation formula to execute before being terminated. The default value is 10 seconds.
Max Recovery Time (hr)	The maximum duration, in hours, for which the collector will attempt to restore data during recovery logic. The default value is 4 hours.
Add Prefix to Messages	The prefix to identify replicated messages on the destination. Alarms and events data will automatically have a prefix added to it with the following syntax: `MachineName_Datasource` For example, if your alarm is forwarded from the server `Almserver12` with a data source named `OPCAE`, the prefix will be `Almserver12_OPCAE`.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.

Field	Description
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

16. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
17. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

18. If needed, restart the collector.

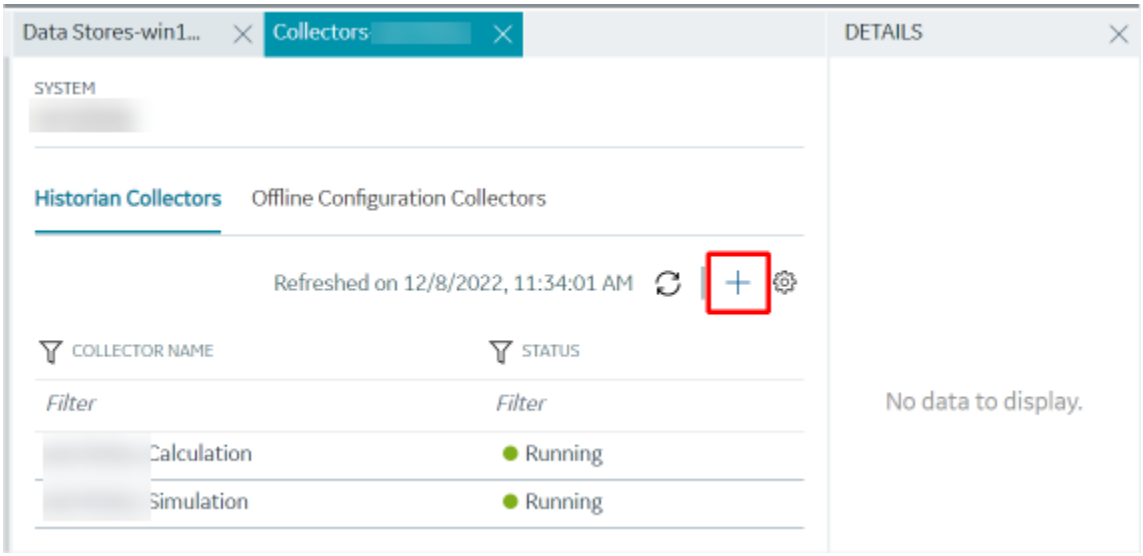
Specify the tags *(on page 1077)* whose data you want to collect using the collector.

Add and Configure a Simulation Collector

The Simulation collector generates random numbers and string patterns for demonstration purposes. For more information, refer to Overview of the Simulation Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Simulation Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears. The **COLLECTOR MACHINE NAME** field is disabled and populated.
7. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.
8. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

a. If you need to send data to a cloud destination, select the cloud destinations as needed.
   - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
   - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
   - **MQTT**- Select this if you need to send data to any of the following cloud destination.
     - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
     - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
     - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

b. If you need to send data to an on-premises Historian server, select **Historian Server**.
   If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.

9. Select **Next**.
   The **Collector Initiation** section appears.
10. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
11. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:

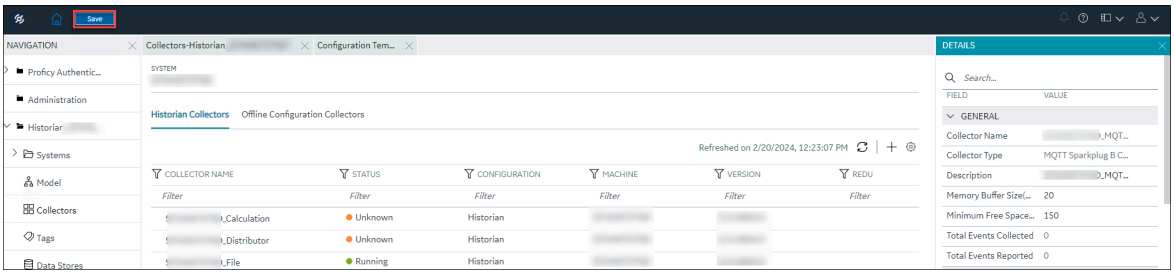
- iH Security Admins
- iH Collector Admins
- iH Tag Admins

You can also configure the collector to start automatically when you start the computer.

12. Select **Add**.
    The collector instance is added. The fields specific to the collector section appear in the **DETAILS** section.
13. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
Number of Tags	The number of Historian tags that you want the create for the collector.
Function Period (seconds)	The period, in seconds, of the `SIN`,`STEP`, and `RAMP` functions implemented in the collector.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

14. As needed, enter values in the other sections common to all collectors *(on page 1298)*.
15. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

16. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

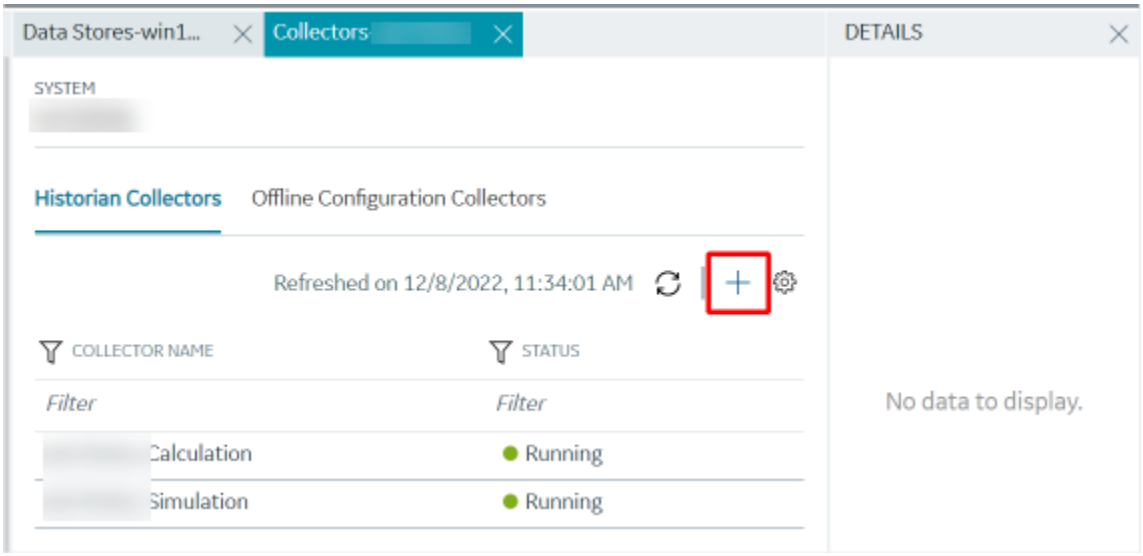
- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

Add and Configure Windows Performance Collector

The Windows Performance collector collects Windows performance counter data. For more information, refer to Overview of the Windows Performance Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Windows Performance Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears. The **WINDOWS MACHINE NAME** field is disabled and populated.
7. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.
8. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

a. If you need to send data to a cloud destination, select the cloud destinations as needed.
   - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
   - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
   - **MQTT**- Select this if you need to send data to any of the following cloud destination.
     - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
     - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
     - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

b. If you need to send data to an on-premises Historian server, select **Historian Server**.
   If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.
   If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
   If the entered credentials are valid, a successful connection message appears.

9. Select **Next**.
   The **Collector Initiation** section appears. The **COLLECTOR NAME** field is populated with a value in the following format: `<Historian server name>_WindowsPerfMon`
10. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
11. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default, this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:

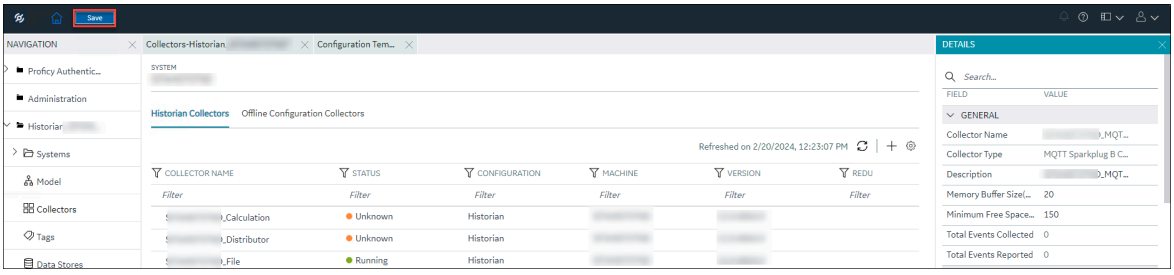
- iH Security Admins
- iH Collector Admins
- iH Tag Admins

You can also configure the collector to start automatically when you start the computer.

12. Select **Add**.
    The collector instance is added.
13. Select the collector instance.
    The fields specific to the collector section appear in the **DETAILS** section.
14. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

15. As needed, enter values in the the other sections common to all collectors *(on page 1298)*.
16. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

17. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

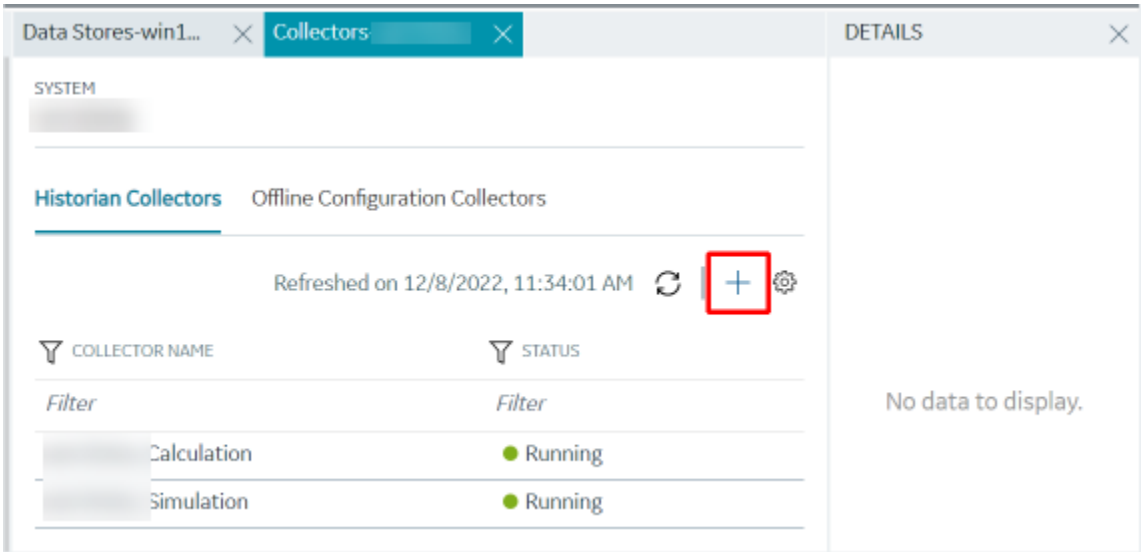
- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

Add and Configure a Wonderware Collector

The Wonderware Collector gathers data samples from a Wonderware Historian 2014 R2 server and stores it in the Proficy Historian server. For more information, refer to Overview of the Wonderware Collector *(on page)*.

This topic describes how to add a collector instance using Configuration Hub. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the default system appears.
3. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

4. In the **MACHINE NAME** field, select the machine in which you want to add a collector instance.
5. In the **COLLECTOR TYPE** field, select **Wonderware Collector**, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
6. Select **Next**.
   The **Source Configuration** section appears. The field is disabled and populated.
7. In the **WONDERWARE SERVER** field, enter the host name or IP address of the Wonderware Historian server from which you want to collect data.
8. Enter values in the **USERNAME** and **PASSWORD** fields to connect to the Wonderware Historian server.
9. Select **Next**.
   The **Destination Configuration** section appears. The collector machine name provided by you is selected as the **Source Configuration** by default.

   Under **CHOOSE DESTINATION**, the **Historian Server** option is selected by default. In addition, the **DESTINATION HISTORIAN SERVER** field is disabled and populated with the collector machine name.

10. Select the destination to which you want to send data, and then enter the values in the corresponding fields. You can send data to an on-premises Historian server or to a cloud destination.

    a. If you need to send data to a cloud destination, select the cloud destinations as needed.
       - **Predix Timeseries**- Select this if you need to send data to Predix cloud. For more information, refer to Predix Cloud *(on page 1340)*.
       - **Azure IoT Hub**- Select this if you need to send data to Azure Cloud in KairosDB format. For more information, refer to Azure IoT Hub (KairosDB format) *(on page 1327)*.
       - **MQTT**- Select this if you need to send data to any of the following cloud destination.
         - Alibaba cloud. For more information, refer to Alibaba Cloud *(on page 1306)*.
         - AWS cloud. For more information, refer to AWS Cloud *(on page 1313)*.
         - Google cloud. For more information, refer to Google Cloud *(on page 1333)*.

    b. If you need to send data to an on-premises Historian server, select **Historian Server**.
       If you created security groups or enabled a strict client/collector authentication, enter the **USERNAME** and **PASSWORD** of the on-premises Historian server that you created during the installation of the collector.

If you entered the **USERNAME**and **PASSWORD**, select **Test Connection**. This will help you to test if the Historian server that you are trying to connect is valid or if the credentials that you entered are valid.
If the entered credentials are valid, a successful connection message appears.

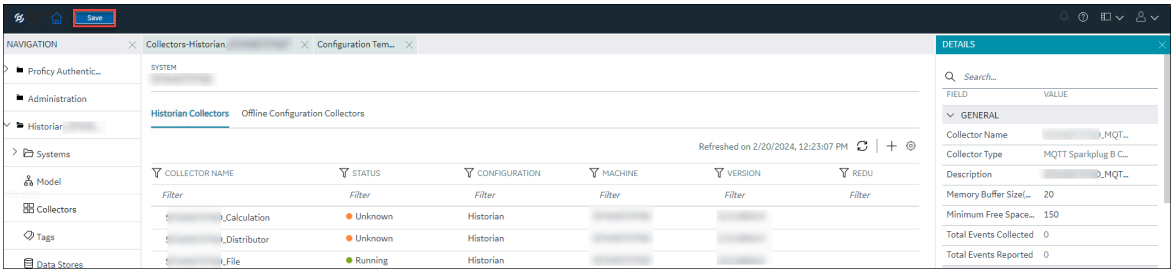
11. Select **Next**.
    The **Collector Initiation** section appears. The **COLLECTOR NAME** field is populated with a value in the following format: `<Historian server name>_Wonderware`
12. If needed, modify the value in the **COLLECTOR NAME** field.
    The value that you enter:
    - Must be unique.
    - Must contain the string `Wonderware`.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
13. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). By default, this option is selected, and the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

      If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    You can also configure the collector to start automatically when you start the computer.
14. Select **Add**.
    The collector instance is added.
15. Select the collector instance.
    The fields specific to the collector section appear in the **DETAILS** section.
16. In the **COLLECTOR SPECIFIC CONFIGURATION** section, configure values as described in the following table.

Field	Description
Recovery Time (hours)	Enter the maximum time, in hours, for which the collector will attempt to recover data after the collector is started or when connection between the collector and the Wonderware Historian server is re-established. This time is calculated as the duration between the current time and the last known write time. Continuous data collection is resumed only after the previous data has been recovered. The default value is 0 hours.
Throttle (Milliseconds)	Enter the frequency of Wonderware data polling. This is to minimize the load on the Wonderware Historian server. By default, Wonderware Collector tries to query the tag data every 100 milliseconds based on the collection interval time. You can change this value to any time between 100 milliseconds to 16 hours.
MTLS Security	Indicates whether you want to use Mutual TLS (MTLS) protocol to enforce a secure and strong authentication mechanism.
MTLS Data Encryption	Indicates whether you want to encrypt the data that the collector shares to the data archiver (DA).
For more information on how to enable MTLS Security, refer to Enable MTLS Security *(on page 1351)*.	

17. As needed, enter values in the the other sections common to all collectors *(on page 1298)*.
18. In the upper-left corner of the page, select **Save**.



The changes to the collector instance are saved.

19. If needed, restart the collector.

Specify the tags whose data you want to collect using the collector. In the **CHOOSE CONFIGURATION** field,

- If you have selected **Historian Configuration**, specify the tags using Configuration Hub *(on page 1077)*.
- If you have selected **Offline Configuration**, modify the offline configuration file of the collector. By default, the file is available in the following location: `<installation folder of Historian>\GE Digital\<collector name>`. For information, refer to Offline Configuration for Collectors *(on page)*. This option is applicable only if you have selected a cloud destination.

Collector Configuration - Common Fields

This topic provides a list of general fields that you can configure for any collector instance. These fields appear in the **DETAILS** section when you select a collector instance. For fields specific to a cloud destination, refer to Alibaba Cloud *(on page 1306)*, AWS Cloud *(on page 1313)*, Azure Cloud *(on page 1320)*, Google Could *(on page 1333)*, and Predix Cloud *(on page 1340)*. For fields specific to the collector type, refer to the topics on adding and configuring each individual collector.

After you enter/modify a value in these fields, the changes are saved automatically after you place the cursor in a different field. Until the changes are saved, the values appear in bold formatting.

Table 33. The General Section

Field	Description
Collector Name	The name of the collector instance. This field is disabled.
Collector Type	The type of the collector instance. This field is disabled.
Description	The description of the collector instance. This field is disabled.
Memory Buffer Size (MB)	The size of the memory buffer currently assigned to the store-and-forward function. The memory buffer stores data during short-term or momentary interruptions of the server connection; the disk buffer handles long duration outages. To estimate the size you need for this buffer, you need to know how fast the collector is trying to send data to the

Table 33. The General Section (continued)

Field	Description
	server and how long the server connection is likely to be down. With those values and a safety margin, you can compute the required size of the buffer. The default value is 20.
Minimum Free Space (MB)	The minimum free disk space that must be available on the computer. If the minimum space required is not available when the collector starts, the collector will shut down.
Total Events Collected	This field is disabled.
Total Events Reported	This field is disabled.

Table 34. The Tags section

Field	Description
Tag Prefix	The prefix that will be added to each tag that you configure for the collector instance. This field is disabled and populated with the name of the collector instance. This field applies to all collectors except File and Calculation collectors.
Collection Interval Value	The interval at which the collector collects data for all the tags configured in the collector instance. • For polled data collection, this value represents the time required to complete a poll of tags in the collector. • For unsolicited data collection, it represents the frequency at which data is retrieved from tags in the collector. The collection interval can be individually configured for each tag. You can set this value for each tag as well.

Table 34. The Tags section (continued)

Field	Description
	Important: For an OPC collector, to avoid collecting redundant values when using device time-stamps, specify a collection interval that is greater than the OPC server update rate.
Collection Interval	The units of measure for the collection interval value.
Collection Type	The type of the data collection: • **Polled:** Data is collected based on a scheduled time interval. This type of data collection is supported only for: ◦ The Calculation collector ◦ The HAB collector ◦ The iFIX collector ◦ The OPC Classic DA collector ◦ The OPC UA DA collector ◦ The Python collector ◦ The Simulation collector ◦ The Windows Performance collector • **Unsolicited:** Data is collected based on an event. This type of data collection is supported only for: ◦ The Calculation collector ◦ The HAB collector ◦ The MQTT collector ◦ The MQTT Sparkplug B collector ◦ The ODBC collector ◦ The OPC Classic DA collector ◦ The OPC Classic HDA collector ◦ The OPC UA DA collector ◦ The OSI PI collector ◦ The OSI PI distributor

Table 34. The Tags section (continued)

Field	Description
	◦ The Python collector ◦ The Server-to-Server collector ◦ The Server-to-Server distributor ◦ The Wonderware Collector
Time Assigned By	Indicates whether the timestamp for the collected data is set based on the data source or the collector. For example, for an OSI PI collector, if you select **Source**, the timestamp of the OSI PI server is considered for the values collected by the collector. If you select **Collector**, the timestamp of the collector is considered.

Table 35. The Collector Compression Section

Field	Description
Collector Compression	Indicates whether you want to apply collector compression, which is a smoothing filter to data retrieved from the data source. By ignoring small changes in values that fall within a deadband centered around the last reported value, only significant changes are stored in Historian, thus consuming less archive storage space. For more information, refer to About Collector and Archive Compression *(on page 1379)*.
Deadband	Indicates whether you want to apply a deadband based on the percentage of values or on absolute values. For example, if you set the deadband to 20% for a range of 0 to 500 engineering units, the deadband value is 100 units, which is 50 units on each side. Therefore, only if the difference between two values is greater than 50, they are stored in Historian.

Table 35. The Collector Compression Section (continued)

Field	Description
	Note: If the data quality changes from good to bad or vice versa, the values are stored in Historian regardless of the deadband value.
Deadband Value	The deadband value that you want to use for values collected by the collector. Depending on whether you have selected percent or absolute, the deadband value is determined. For example, if you want to set a deadband of 5 units on either side of a value (that is, value +/- 5), enter 10 in the **Deadband Value** field, and select **Absolute** in the **Deadband** field. Similarly, if you want to set a deadband of 5% on either side of a value, enter 10 in the **Deadband Value** field, and select **Percent** in the **Deadband** field. For more information, refer to About Collector and Archive Compression *(on page 1379)*.
Compression Timeout	The time for one poll cycle for which collector compression is not used, thus sending all the samples to Historian. This is used for a Calculation collector or Server-to-Server collector, when calculations fail, you may possibly observe collector compression (even if it is not enabled), thus producing no results or bad quality data. In such cases, you can use compression timeout, thus sending all the samples to Historian. For more information, refer to About Collector and Archive Compression *(on page 1379)*.

Table 35. The Collector Compression Section (continued)

Field	Description
Compression Timeout Interval	The units of measure for compression timeout.
Spike Logic Control	Indicates whether you want to apply spike logic to tag values. When you apply spike logic, in the event of a sudden change in tag values, a data sample is inserted just before the spike. The timestamp of the inserted sample is determined by your polling interval. If samples are collected at 1 second intervals, the inserted sample's timestamp will be 1 second before the spike. This helps clearly identify the spike, and retains a more accurate picture of the data leading up to it. For more information, refer to Enable Spike Logic *(on page)*.
Multiplier	Specifies how much larger a spike value must be than the deadband range before the spike logic is invoked. For example, if you enter 3 in the **Multiplier** field, and the deadband is set to 5%, the spike logic will not be invoked until the difference between the spike value and the previously archived data point is 15% of the EGU range.
Interval	Specifies how many samples must have been compressed before the spike logic is invoked. For example, if you enter 4 in the **Interval** field, and 6 values have been compressed since the last archived data sample, the spike logic will be invoked.

Table 36. The Collector Options Section

Field	Description
Online Tag Configuration Changes	Indicates whether you want tag configuration changes to reflect immediately. If you disable this option, any tag configuration changes will reflect only after you restart the collector instance.
Browse Source Address Space	Indicates whether you want to allow browsing for tags in the source. You may sometimes want to disable this option to reduce processing load on the collector.
Synchronize Timestamps to Server	Indicates whether you want to adjust the time-stamp of data to align with the time setting in the Historian server. Note that this does not change the time setting in the collector machine; it only calculates the timestamp based on the difference between the time settings in the server machine and the collector machine, independent of time zone or daylight saving differences. **Note:** • This option is applicable only if the timestamp of the collector is considered (instead of that of the data source - as specified in the **Time Assigned By** field). • If this option is disabled, and if the time in the collector machine is more than 15 minutes ahead of the time in the server machine, data will not be stored in Historian.
Source/Device Timestamp in	The source/device timestamp format. Either UTC or Local.

Table 36. The Collector Options Section (continued)

Field	Description
Delay Collection at Startup (sec)	The duration, in seconds, after which you want the data collection to begin post tag configuration.

Table 37. The Advanced Section

Field	Description
Debug Mode	The debug mode for collector logs. 0 indicates normal log level, whereas 255 indicates that debugging is enabled. **Note:** Leaving the debug mode enabled for a long time consumes disk space.
Message Compression	Indicates whether you want to apply message compression.

Table 38. The Collector Status Output Section

Field	Description
Rate Output Address	The address in the source database into which the collector writes the output of events/minute. This will help an operator (or a HMI/SCADA application) learn the performance of the collector. Values are captured once a minute. You must enter the address of a writable analog field. For example, for an iFIX collector, enter the address of an iFIX tag in the following format: `<node name>.<tag name>.<field name>` (for example, `MyNode.MySIM_AO.F_CV`).
Status Output Address	The address in the source database into which the collector writes the current value of its status (for example, running, stopped). This will help an opera-

Table 38. The Collector Status Output Section (continued)

Field	Description
	tor (or a HMI/SCADA application) learn the current status of the collector. The value is updated only if the status of the collector changes. You must enter the address of a writable text field of at least eight characters. For an iFIX collector, use TX tag for the output address. Enter the address in the following format: `<node name>.<tag name>.<field name>` (for example, `MyNode.MyCollector_TX.A_CV`).
Heartbeat Output Address	The address in the source database into which the collector writes the heartbeat signal output. Values are captured once a minute. You must enter the address of a writable analog field. For an iFIX data collector, use an iFIX tag for the output address. Enter the address in the following format: `<node name>.<tag name>.<field name>` (for example, `MyNode.MyCollector_TX.A_CV`). You can program the iFIX database to generate an alarm if values are not written every minute, notifying you that the collector has stopped.

Sending Data to Cloud

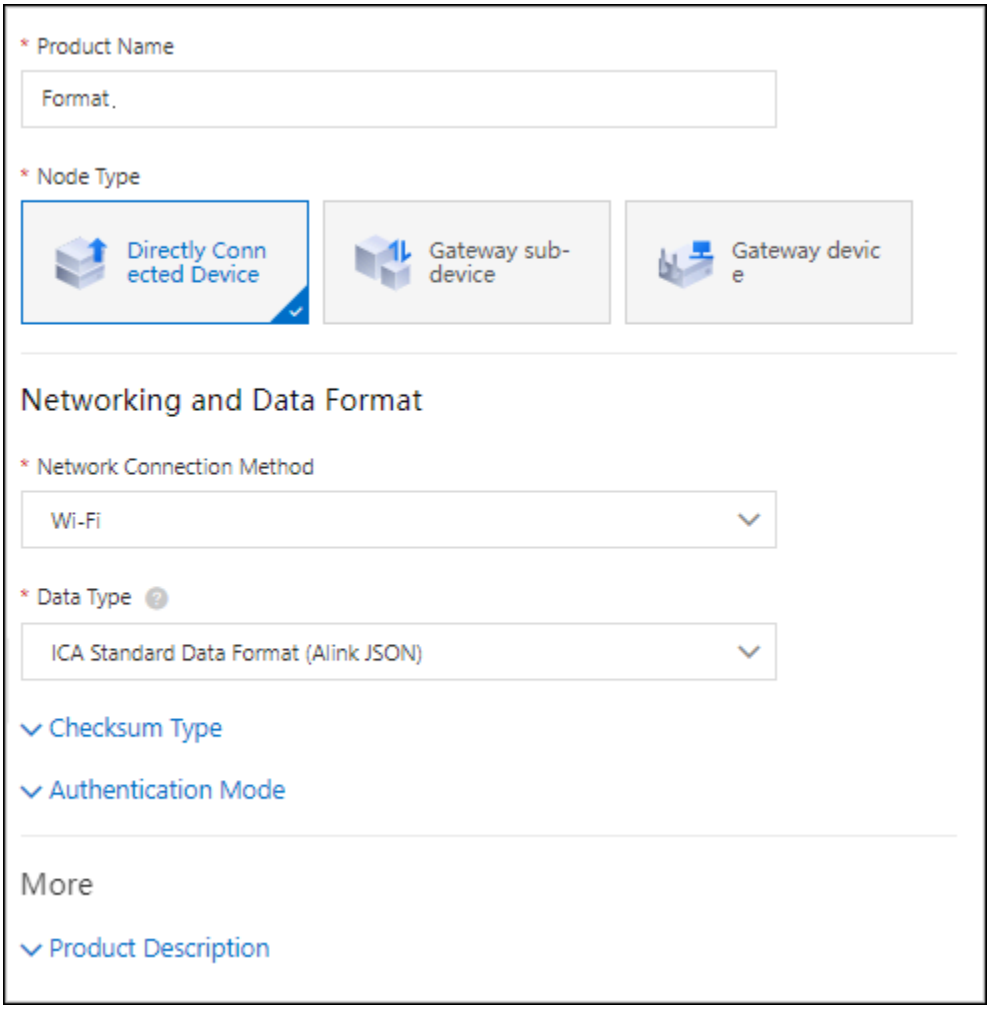
Send Data to Alibaba Cloud

Generate a password using the utility. While generating the password, use the same algorithm that you will use to connect to Alibaba Cloud.

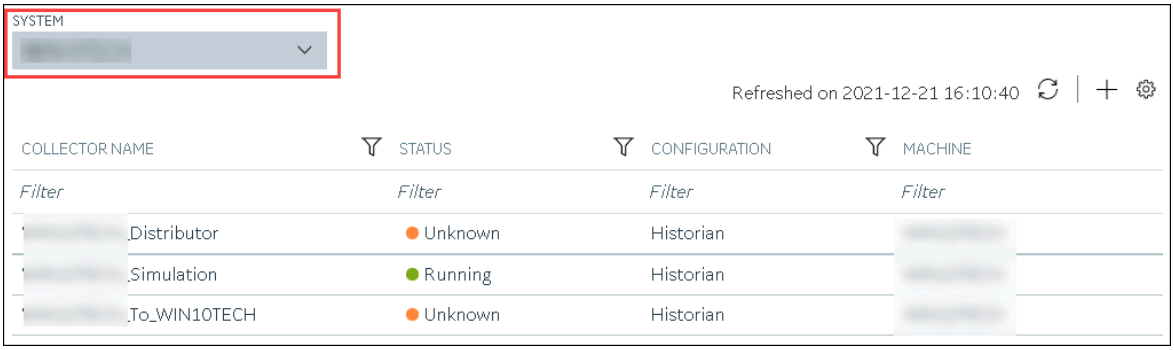
To send data to Alibaba Cloud, you can choose any of the following collectors:

- The iFIX collector
- The MQTT collector
- The ODBC collector
- The OPC Classic DA collector
- The OPC Classic HDA collector
- The OPC UA DA collector
- The OSI PI collector
- The Python Collector
- The Server-to-Server collector
- The Simulation collector
- The Windows Performance collector
- The Wonderware collector

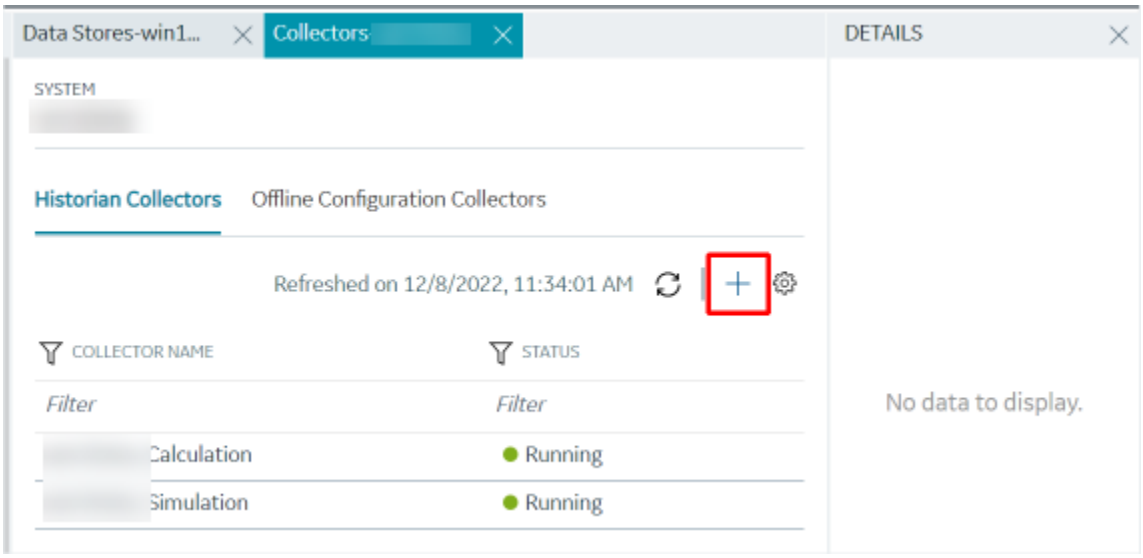
1. Access Alibaba IoT Platform console.
2. Create a product. When you do so:
    - In the **Node Type** field, select **Directly Connected Device**.
    - In the **Network Connection Method** field, select **Wi-Fi**.
    - In the **Data Type** field, select **ICA Standard Data Format**.



3. Note down the region ID for the region you have selected. For a list of region IDs, refer to https://www.alibabacloud.com/help/doc-detail/40654.htm.
4. Access the product certificate, and note down the product secret and product key values.
5. Create a device.
6. Access Configuration Hub *(on page 1055)*.
7. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the system appears.
8. If needed, select the system in which you want to add a collector instance.

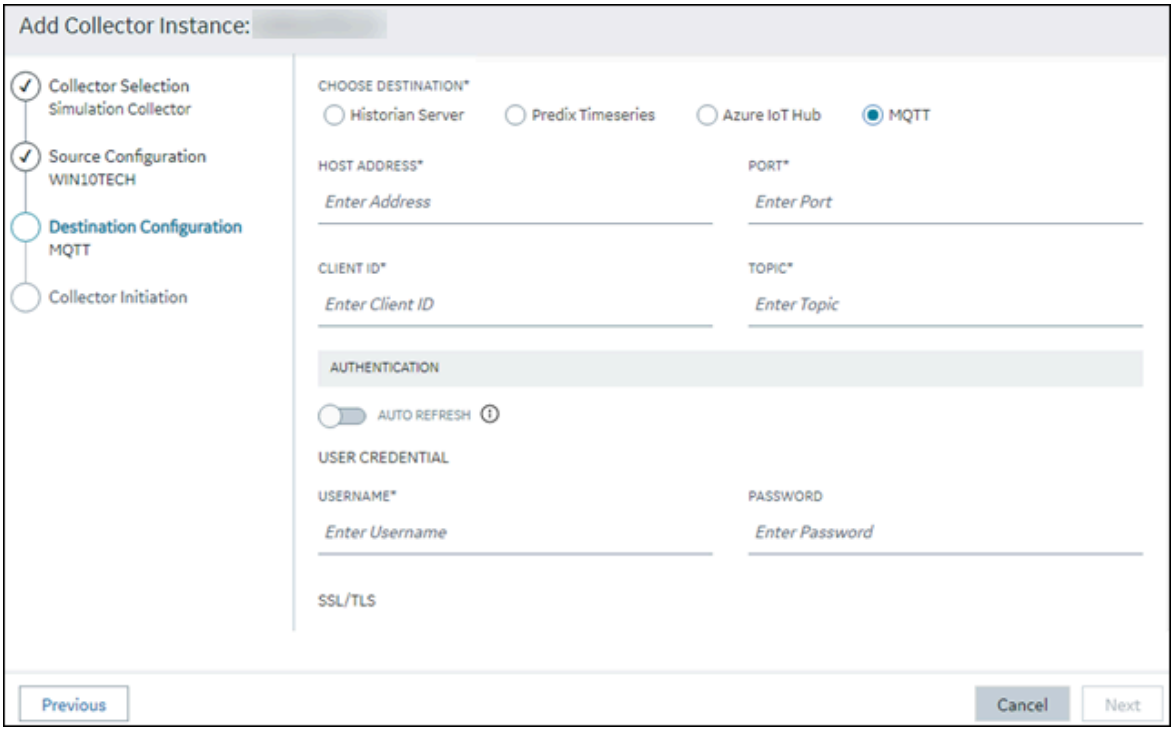


9. In the upper-right corner of the main section, select +.



   The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

10. In the **COLLECTOR TYPE** field, select a collector type, and then select **Get Details**.
    The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
11. Select **Next**.
    The **Source Configuration** section appears, populating the hostname of the collector machine.
12. As needed, enter values in the available fields, and then select **Next**.
    The **Destination Configuration** section appears.

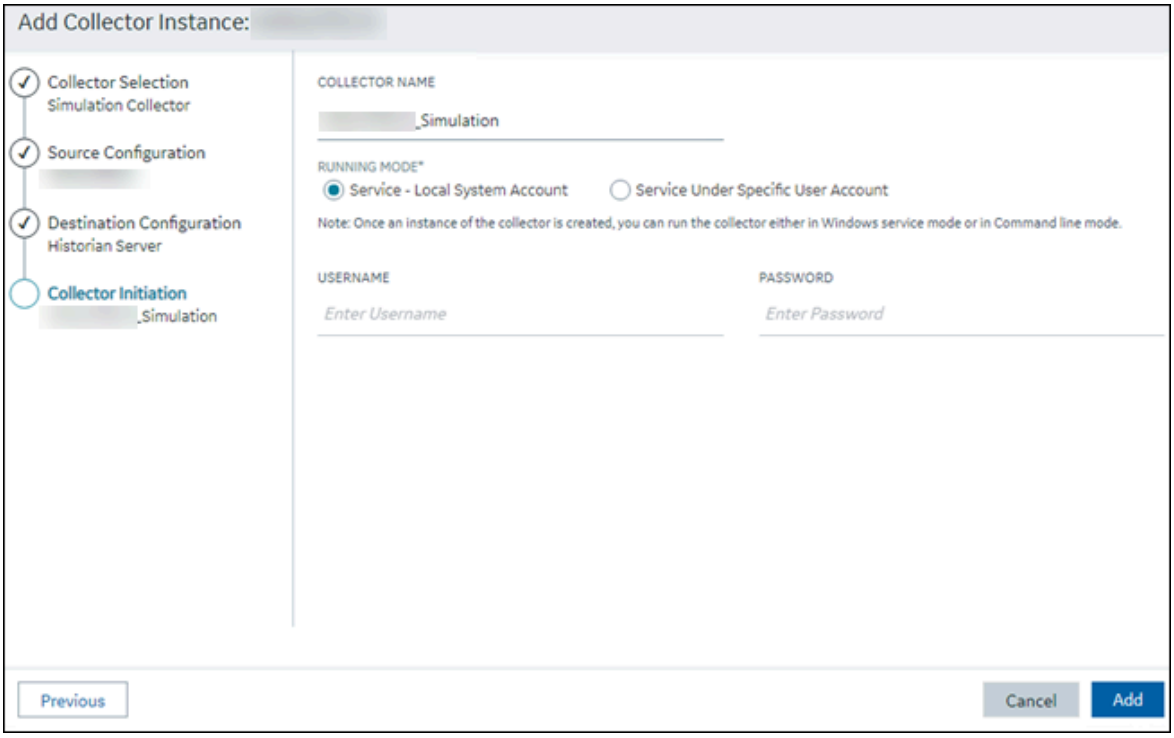


13. In the **CHOOSE DESTINATION** field, select **MQTT**, and then provide values as described in the following table.

Field	Description
HOST ADDRESS	Enter a value in the following format: `<product name>.iot-as-mqtt.<region ID>.aliyuncs.com`. A value is required. For example: `a23dr53dwrt.iot-as-mqtt.cn-shanghai.aliyuncs-.com`
PORT	Enter `1883`. A value is required.
CLIENT ID	Enter a value in the following format: `<device name>|securemode=<value>,signmethod=<algorithm name>`. A value is required. ◦ For securemode, enter `2` for direct TLS connection, or enter `3` for direct TCP connection. ◦ For signmethod, specify the signature algorithm that you want to use. Valid values are hmacmd5, hmacsha1, hmacsha256, and sha256. You must use the same algorithm to generate the password. For example: `MyDevice|securemode=3,signmethod=hmacsha1`

Field	Description
TOPIC	Enter a value in the following format: `/sys/<product name>/<device name>/thing/event/property/post`. A value is required. For example: `/sys/a23dr53dwrt/MyDevice/thing/event/property/post`
USERNAME	Enter a value in the following format: `<device name><product name>`. A value is required. For example: `MyDevicea23dr53dwrt`
PASSWORD	Enter the password that you have generated. A value is required.
CHOOSE CONFIGURATION	Select the type of the configuration to specify the tags whose data you want to collect. Select one of the following options: ◦ **Historian Configuration**: Select this option if you want to add the tags manually using Historian Administrator *(on page 1378)*. If you select this option, the **CONFIGURATION HISTORIAN SERVER** field appears. ◦ **Offline Configuration**: Select this option if you want to provide the tag names using the offline configuration *(on page)* file instead of adding tags manually. By default, this file is located in the following location: `<installation folder of Historian>\GE Digital\<collector name>`

14. Select **Next**.
    The **Collector Initiation** section appears.



15. Enter a collector name.

    The value that you enter:

    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.

16. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    If you choose the first option, you can also configure the collector to start automatically when you start the computer, or, in the case of iFIX collectors, whenever you start iFIX.

17. Select **Add**.
    The collector instance is created.
18. Specify the tags for which you want to collect data.
    - If you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags manually *(on page 1077)*.
    - If you have selected **Offline Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags using the offline configuration file *(on page)*.

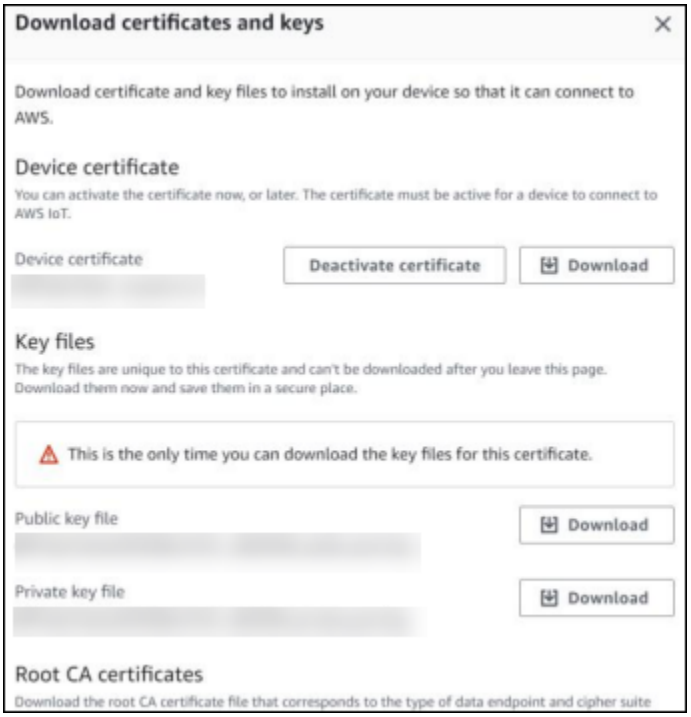
    The collector begins sending Historian data to the device that you have created.

Send Data to AWS IoT Core

To send data to an AWS IoT Code, you can choose any of the following collectors:

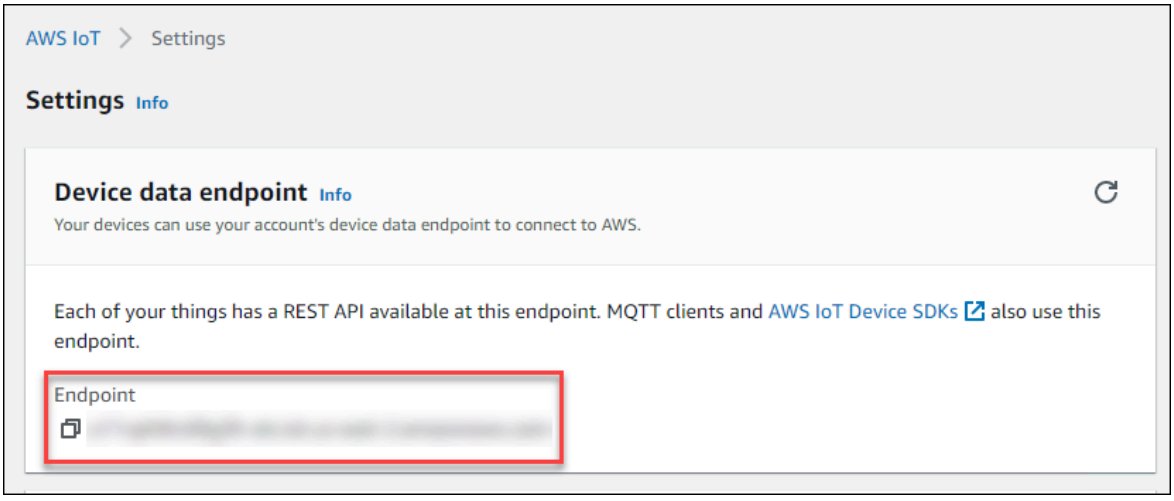
- The iFIX collector
- The MQTT collector
- The ODBC collector
- The OPC Classic DA collector
- The OPC Classic HDA collector
- The OPC UA DA collector
- The OSI PI collector
- The Python Collector
- The Server-to-Server collector
- The Simulation collector
- The Windows Performance collector
- The Wonderware collector

1. Access the **AWS Management Console** page.
2. Search and select **IoT Core**.
   The **AWS IoT** page appears.
3. Create a policy allowing the permissions that you want to grant on your device (for example, iot:Connect, iot:Publish, iot:Subscribe, iot:Receive). For the resource, provide the topic name. If, however, you want to use all topics, enter *.
4. Create a thing, linking it with the policy that you have created.
5. Download the certificates and key files for the device to communicate. In addition, download the root CA certificate.



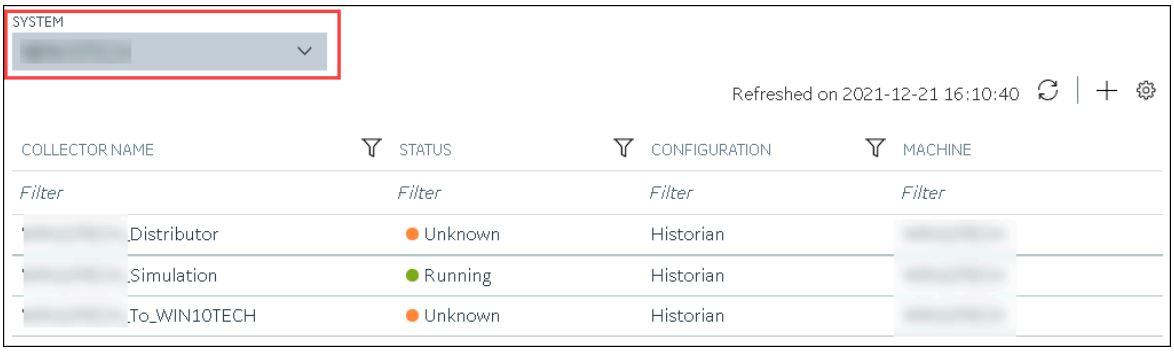
Important:
This is mandatory, and it is the only time you can download the certificates.

6. In the left navigation pane, select **Settings**.
7. Make a note of the endpoint that appears.

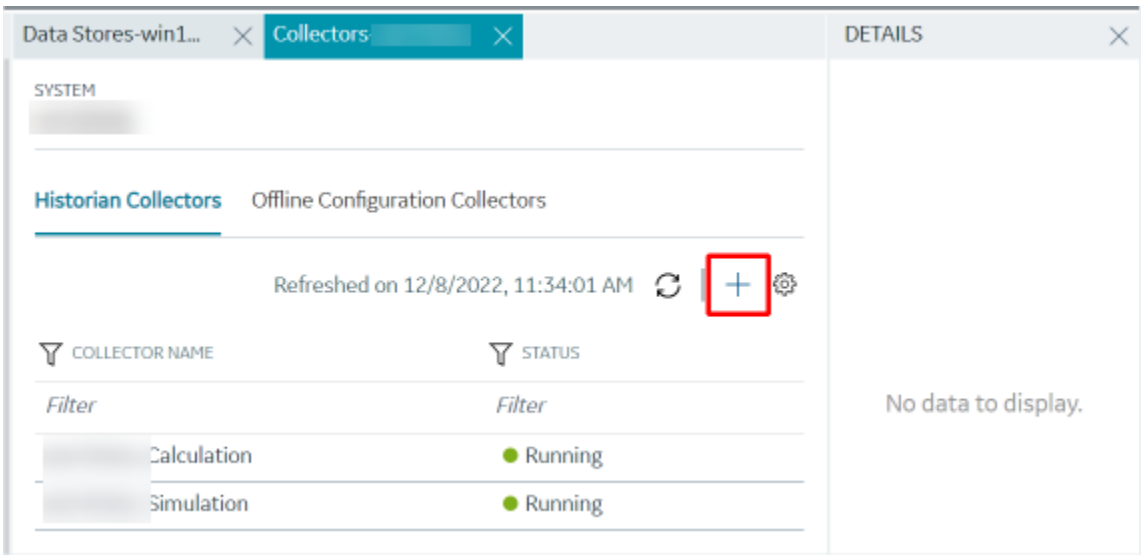


8. Access Configuration Hub *(on page 1055)*.
9. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the system appears.

10. If needed, select the system in which you want to add a collector instance.

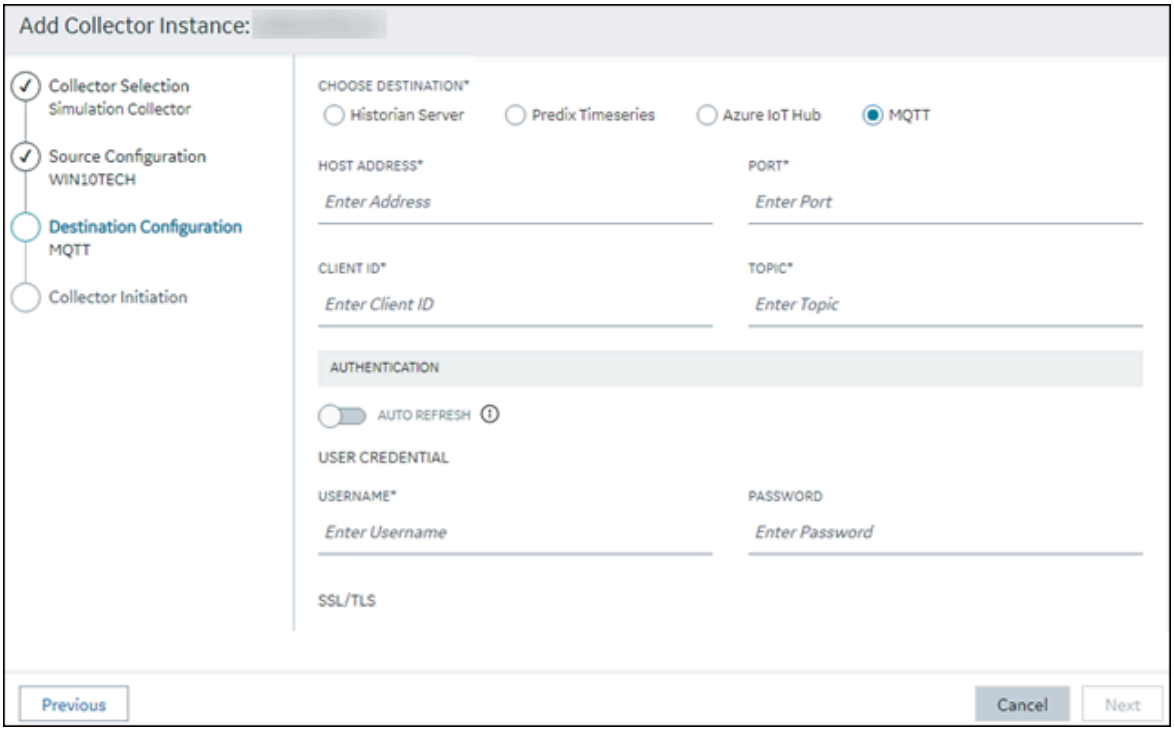


11. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

12. In the **COLLECTOR TYPE** field, select a collector type (except the File collector and the Server-to-Server collector), and then select **Get Details**.
    The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
13. Select **Next**.
    The **Source Configuration** section appears, populating the hostname of the collector machine.
14. As needed, enter values in the available fields, and then select **Next**.
    The **Destination Configuration** section appears.



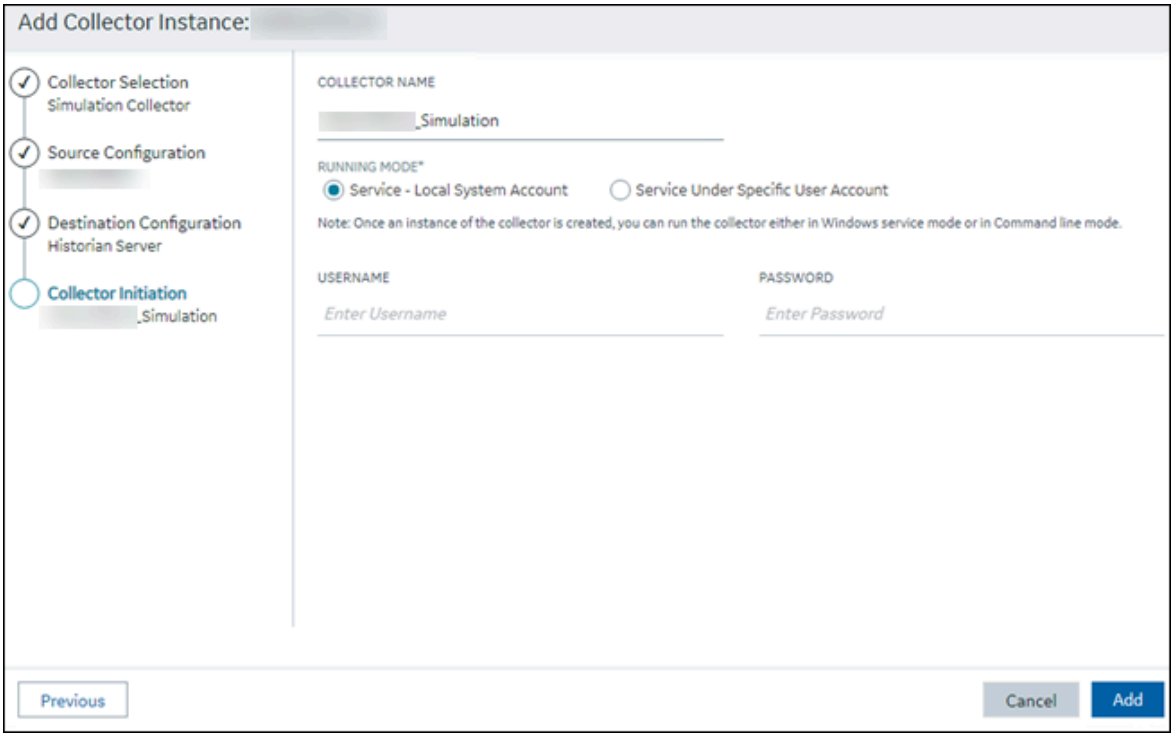
15. In the **CHOOSE DESTINATION** field, select **MQTT**, and then provide values as described in the following table.

Field	Description
HOST ADDRESS	Enter the endpoint that you have noted down. A value is required.
PORT	Enter 8883. A value is required.
CLIENT ID	Enter the thing name. A value is required.
TOPIC	Enter the MQTT topic to which you want the collector to publish data. A value is required. For information on topic names, refer to https://docs.aws.amazon.com/iot/latest/developer-guide/topics.html.
USERNAME	Enter any value. Since we will use a certificate-based authentication, username and password will not be used; however, you must still enter a value.

Field	Description
PASSWORD	Enter any value. Since we will use a certificate-based authentication, username and password will not be used; however, you must still enter a value.
CA SERVER ROOT FILE	Enter the path of the root CA certificate file that you have downloaded.
CLIENT CERTIFICATE	Enter the path of the device certificate that you have downloaded.
PRIVATE KEY FILE	Enter the path of the private key file that you have downloaded.
PUBLIC KEY FILE	Enter the path of the public key file that you have downloaded.
CHOOSE CONFIGURATION	Select the type of the configuration to specify the tags whose data you want to collect. Select one of the following options: ◦ **Historian Configuration**: Select this option if you want to add the tags manually using Historian Administrator *(on page 1378)*. If you select this option, the **CONFIGURATION HISTORIAN SERVER** field appears. ◦ **Offline Configuration**: Select this option if you want to provide the tag names using the offline configuration *(on page)* file instead of adding tags manually. By default, this file is located in the following location: <*installation folder of Historian*>\GE Digital\<*collector name*>

16. Select **Next**.

    The **Collector Initiation** section appears.



17. Enter a collector name.

    The value that you enter:

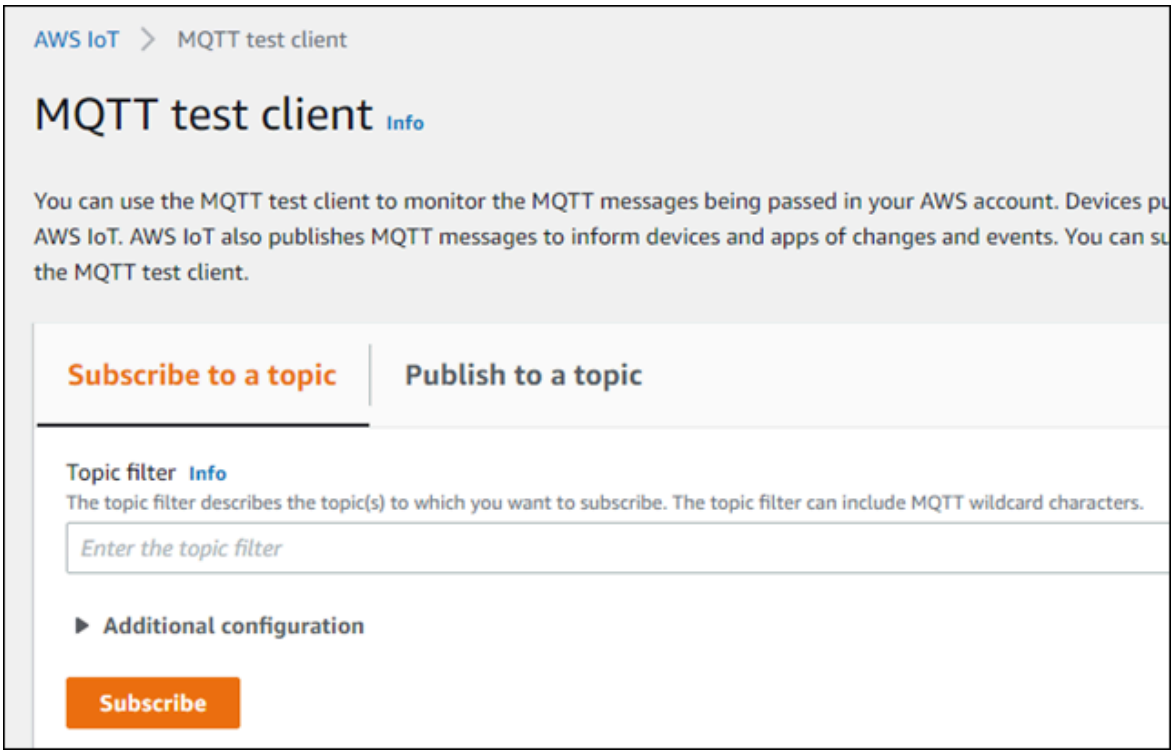
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.

18. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
        - iH Security Admins
        - iH Collector Admins
        - iH Tag Admins

    If you choose the first option, you can also configure the collector to start automatically when you start the computer, or, in the case of iFIX collectors, whenever you start iFIX.

19. Select **Add**.
    The collector instance is created.
20. Specify the tags for which you want to collect data.
    - If you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags manually *(on page 1077)*.
    - If you have selected **Offline Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags using the offline configuration file *(on page)*.

    The collector begins sending Historian data to the thing that you have created.
21. Access AWS IoT Core, and in the left pane, select **Test**.
    The **MQTT test client** page appears.



22. Subscribe to the topic to which the collector is publishing data, and then select **Subscribe**.
    The messages received from the topic appear, indicating that the collector is sending data to the AWS IoT device.
    AWS supports a payload of maximum 128 KB. Therefore, if the message size is greater than 128 KB, create a registry key named CloudMaxSamplesPerMsg for the collector instance, and decrease the value to 700 or less. If, however, you want to send more data in a message, we recommend that you create another collector instance and send data to another thing resource in AWS.

> **Tip:**
> To find out the message size, modify the collector instance *(on page 1353)* and set the log level to 3 or more.

23. Create a VPC destination or an HTTP destination for the messages.
24. Monitor the data that you have collected.

Send Data to Azure Cloud in the Key-Value Format

To send data to an Azure IoT Hub device, you can choose any of the following collectors:

- The iFIX collector
- The MQTT collector
- The ODBC collector
- The OPC Classic DA collector
- The OPC Classic HDA collector
- The OPC UA DA collector
- The OSI PI collector
- The Python Collector
- The Server-to-Server collector
- The Simulation collector
- The Windows Performance collector
- The Wonderware collector

This topic describes how to send data in the key-value format. In this format, the message size is bigger because names of the tag properties are repeated. However, it provides clarity to novice users. For example: `{"body":`

```
[{"tagname":"Azure_Iot_simulation_tag_1","epochtime":1629730936000,"tagvalue":7129.124023438,"quality":3},
{"tagname":"Azure_Iot_simulation_tag_2","epochtime":1629730936000,"tagvalue":123.3738924567,"quality":3}] ,"messa
```

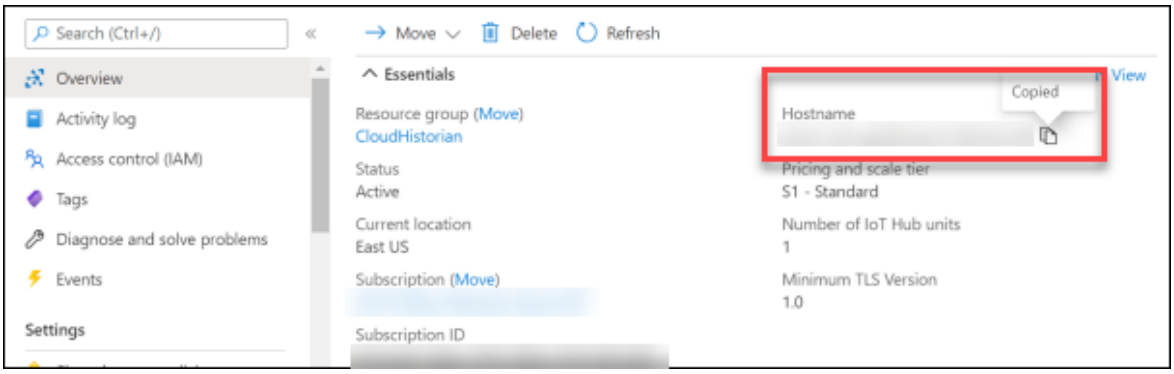
You can also send data in the KairosDB format *(on page 1327)*.

> **Note:**
> Data in Azure IoT Hub is stored for maximum seven days, after which it is deleted from the hub. Therefore, you must consume the data within seven days. Based on your requirement, you can store it in a relevant Azure storage. You can then use Azure functions or streaming analytics to analyse the data.

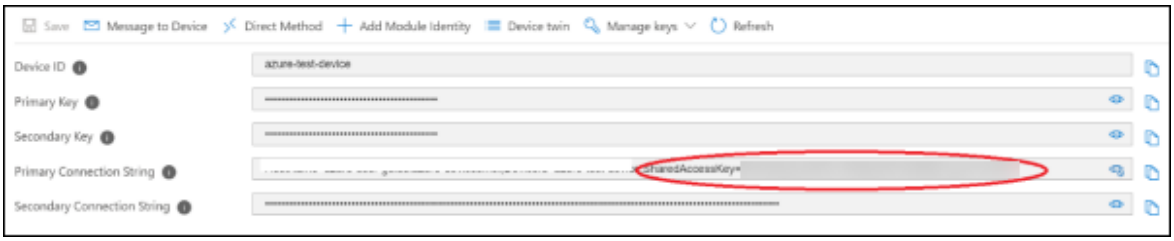
1. Create Azure IoT Hub.

> **Tip:**
> To choose the correct Azure IoT Hub tier based on your data throughput, refer to https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-quotas-throttling. For guidance on choosing the appropriate subscription, refer to https://azure.microsoft.com/en-us/pricing/details/iot-hub/

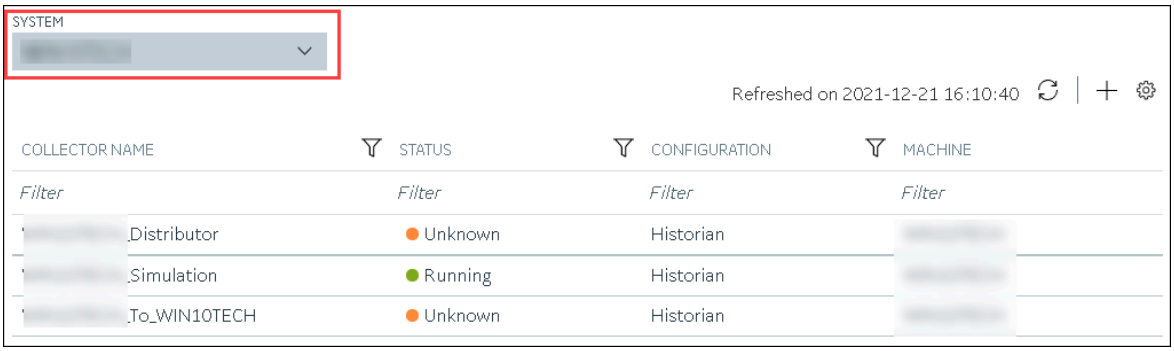
2. After you create Azure IoT Hub, select **Go to resource**, and then note down the hostname:



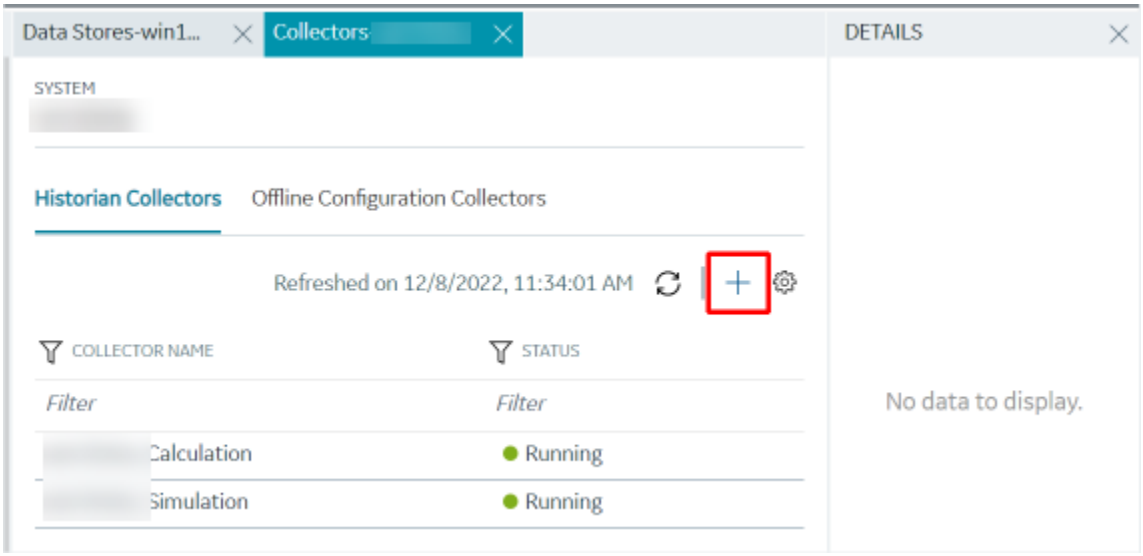
3. Create devices in Azure IoT Hub to group related tag information; thus mapping a collector instance to a device. We recommend that you create one device per collector instance. Ensure that the device is running.
   When you create a device, use the following guidelines to choose the authentication type:
   - **Symmetric Key**: Select this option if you want to use a Shared Access Signature (SAS) authentication.
   - **X.509 Self-Signed**: Select this option if you want to create self-signed certificates using OpenSSL. We recommend that you use these certificates only for testing purposes. For instructions, refer to https://docs.microsoft.com/en-us/azure/iot-hub/tutorial-x509-self-sign.
   - **X.509 CA Signed**: Select this option if you want to use CA-signed certificates
4. If you have selected **Symmetric Key** in the previous step, select the link in the **Device ID** column, and note down the shared access key value.



5. Access Configuration Hub *(on page 1055)*.
6. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
7. If needed, select the system in which you want to add a collector instance.
8. If needed, select the system in which you want to add a collector instance.

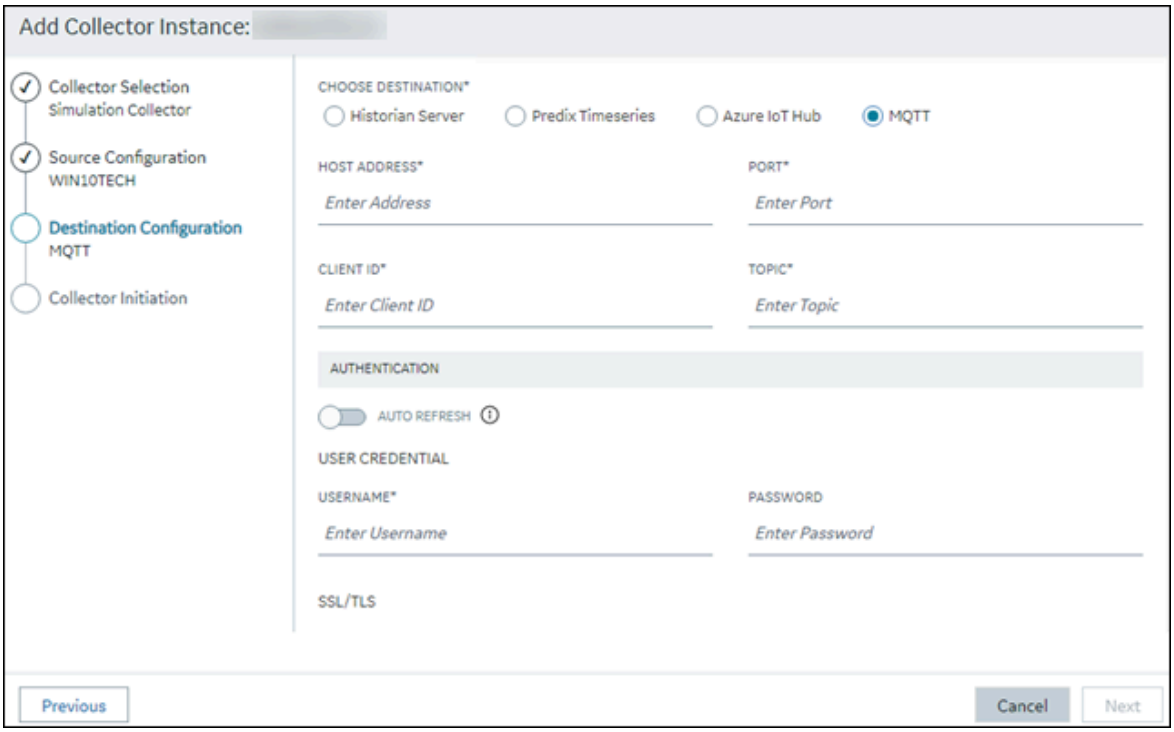


9. In the upper-right corner of the main section, select +.



   The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.
10. In the **COLLECTOR TYPE** field, select a collector type, and then select **Get Details**.
    The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
11. Select **Next**.
    The **Source Configuration** section appears.
12. As needed, enter values in the available fields.
13. Select **Next**.

The **Destination Configuration** section appears.



14. Select **MQTT**, and provide values as described in the following table.

Field	Description
HOST ADDRESS	Enter the host name of the resource that you have noted down in step 2. A value is required and must be in the following format: `<Azure IoT Hub name>.azure-devices.net`
PORT	Enter `8883`.
CLIENT ID	Enter the ID of the device that you created in step 3. A value is required and must be unique for an MQTT broker.
TOPIC	Enter `devices/<device ID>/messages/events`.
AUTO REFRESH	Indicates whether you want to automatically create/refresh the SAS authentication token when it expires.

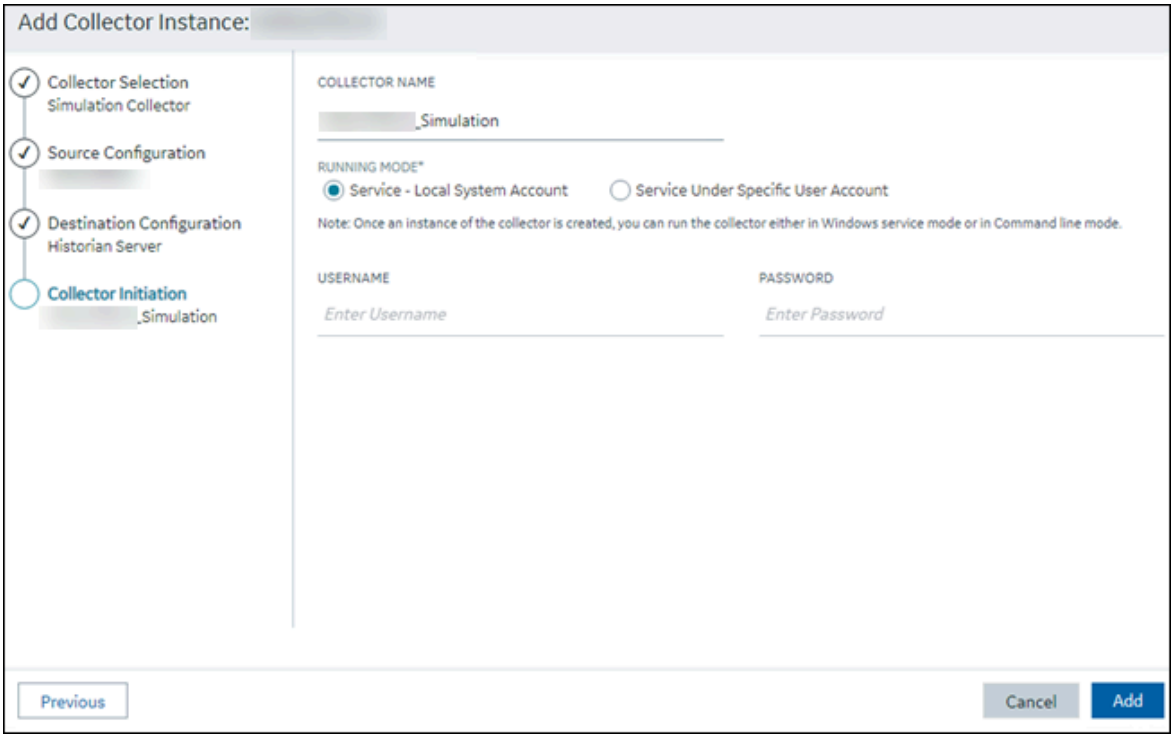
Field	Description
	◦ If you switch the toggle off, you must manually provide the token as soon as it expires. ◦ If you switch the toggle on, you must provide the shared access key that you have noted down in step 4. And, you can leave the **PASSWORD** field blank. This is applicable only if you have selected **Symmetric Key** in step 3.
USERNAME	Enter a value in the following format: `<host name or IP address>/<device ID>/?api-version=2018-06-30`
PASSWORD	Enter the SAS token. This is applicable only if you have selected **Symmetric Key** in step 3 and if you have switched off the **AUTO REFRESH** toggle. For instructions on generating a SAS token, refer to https://docs.microsoft.com/en-us/azure/cognitive-services/translator/document-translation/create-sas-tokens?tabs=Containers.
DEVICE SHARED KEY	Enter the shared access key value that you noted down in step 4. A value is required. This is applicable only if you have selected **Symmetric Key** in step 3 and if you have switched the **AUTO REFRESH** toggle on.
CA SERVER ROOT FILE	Enter the path of the CA server root file that you want to use. You can find the file here: https://github.com/Azure-Samples/IoTMQTTSample/blob/master/IoTHubRootCA_Baltimore.pem.
CLIENT CERTIFICATE	Enter the path to the client certificate. A value is required. This is applicable only if you have selected one of these options in step 3:

Field	Description
	◦ **X.509 Self-Signed**: If you have selected this option, you can generate the certificate using OpenSSL. ◦ **X.509 CA Signed**: If you have selected this option, you would receive the certificate from CA.
PRIVATE KEY FILE	Enter the complete path to the private key file. A value is required. This is applicable only if you have selected one of these options in step 3: ◦ **X.509 Self-Signed**: If you have selected this option, you can generate the key file using OpenSSL. ◦ **X.509 CA Signed**: If you have selected this option, you would receive the key file from CA.
PUBLIC KEY FILE	Enter the path to the public key file. This is applicable only if you have selected one of these options in step 3: ◦ **X.509 Self-Signed**: If you have selected this option, you can generate the key file using OpenSSL. ◦ **X.509 CA Signed**: If you have selected this option, you would receive the key file from CA.
CHOOSE CONFIGURATION	The type of the configuration to specify the tags whose data you want to collect. Select one of the following options: ◦ **Historian Configuration**: Select this option if you want to add the tags manually *(on page 1077)*. If you select this option, the **CONFIGURATION HISTORIAN SERVER** field appears. ◦ **Offline Configuration**: Select this option if you want to provide the tag names using the offline configuration *(on page*

Field	Description
	) file instead of adding tags manually. By default, this file is located in the following location: <*installation folder of Historian*>\GE Digital\<*collector name*>
CONFIGURATION HISTORIAN SERVER	The host name of the machine from which you want to access Historian Administrator to add the tags manually for the collector. This field appears only if you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field.

15. Select **Next**.

    The **Collector Initiation** section appears.



16. Enter a collector name.

    The value that you enter:

    - Must be unique.
    - Must not exceed 15 characters.

- Must not contain a space.
- Must not contain special characters except a hyphen, period, and an underscore.

17. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
        - iH Security Admins
        - iH Collector Admins
        - iH Tag Admins

    If you choose the first option, you can also configure the collector to start automatically when you start the computer, or, in the case of iFIX collectors, whenever you start iFIX.
18. Select **Add**.
    The collector instance is created.
19. Specify the tags for which you want to collect data.
    - If you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags manually *(on page 1077)*.
    - If you have selected **Offline Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags using the offline configuration file *(on page)*.

    The collector begins sending Historian data to the Azure IoT Hub device that you have created.

Send Data to Azure Cloud in the KairosDB Format

To send data to an Azure IoT Hub device, you can choose any of the following collectors:

- The iFIX collector
- The MQTT collector
- The ODBC collector
- The OPC Classic DA collector
- The OPC Classic HDA collector
- The OPC UA DA collector
- The OSI PI collector
- The Server-to-Server collector

- The Simulation collector
- The Windows Performance collector
- The Wonderware collector

This topic describes how to send data in the KairosDB format. In this format, the message size is less because names of the tag properties are not repeated. For example: `[{"<tag name>":"Cloud_GCYSS3X2E.Simulation00001","<timestamp, tag value, and quality>":[[1586260104000,132560.203125000,3]]}`. If you use this format, you can only use SAS-based authentication; you cannot use certificate-based authentication.

You can also send data in the key-value format *(on page 1320)*.

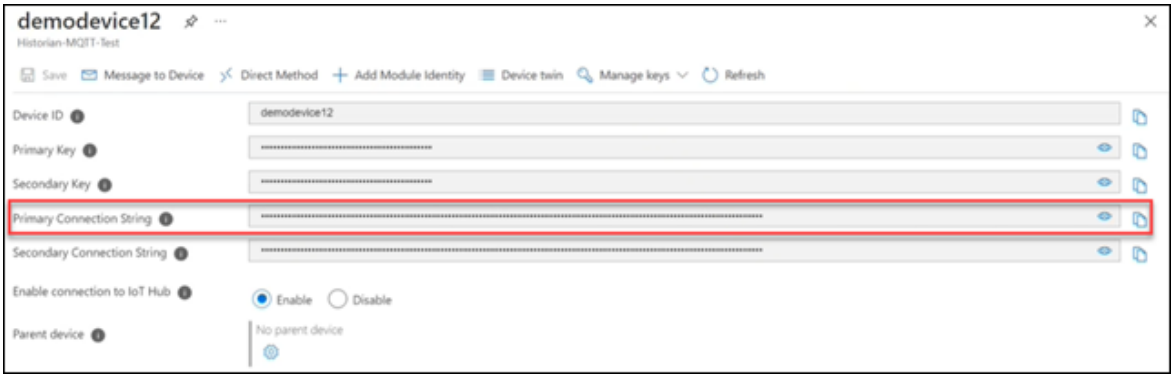
Note:
Data in Azure IoT Hub is stored for maximum seven days, after which it is deleted from the hub. Therefore, you must consume the data within seven days. Based on your requirement, you can store it in a relevant Azure storage. You can then use Azure functions or streaming analytics to analyse the data.

1. Create Azure IoT Hub.

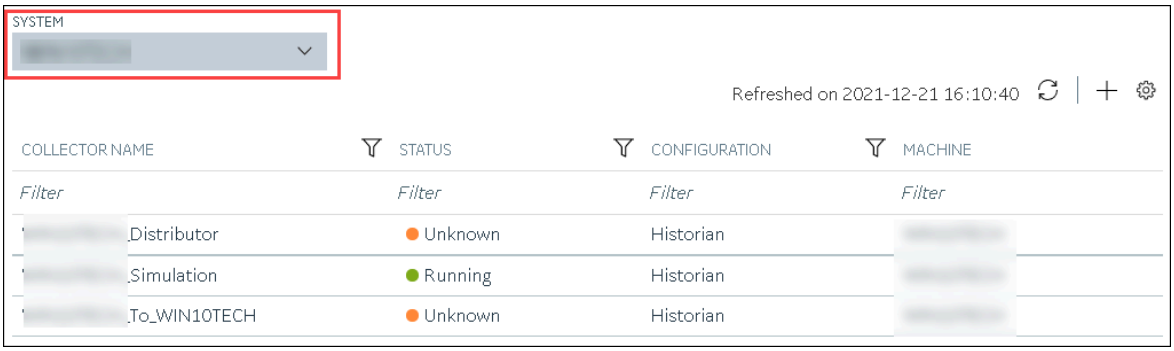
   

   Tip:
   To choose the correct Azure IoT Hub tier based on your data throughput, refer to https://docs.microsoft.com/en-us/azure/iot-hub/iot-hub-devguide-quotas-throttling. For guidance on choosing the appropriate subscription, refer to https://azure.microsoft.com/en-us/pricing/details/iot-hub/

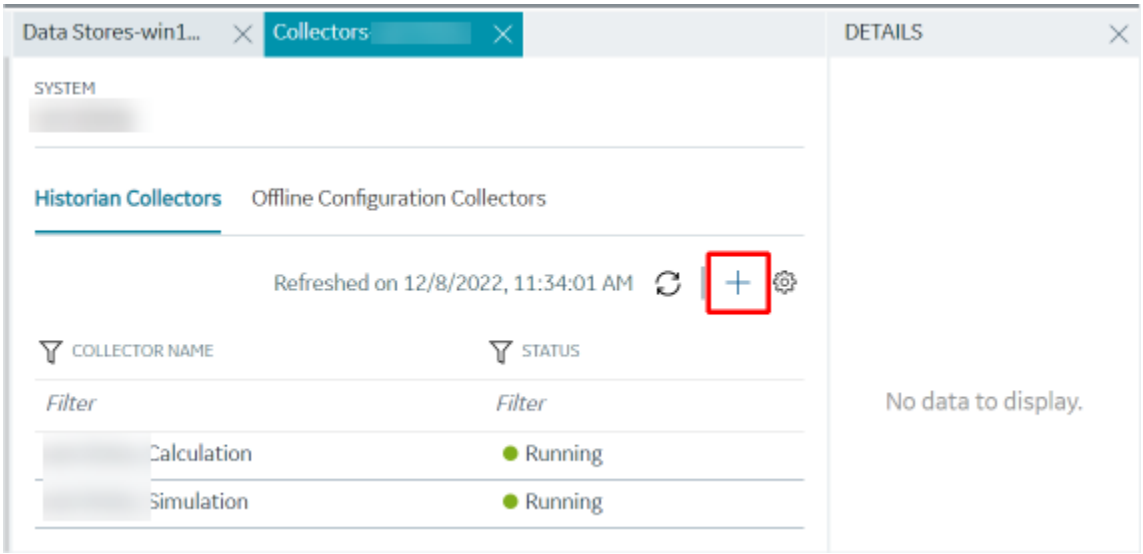
2. Create devices in Azure IoT Hub to group related tag information; thus mapping a collector instance to a device. We recommend that you create one device per collector instance. Ensure that the device is running.
   When you create a device, use only in the Symmetric Key authentication.
3. Select the link in the **Device ID** column, and note down the primary connection string value.



4. Access Configuration Hub *(on page 1055)*.
5. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
6. If needed, select the system in which you want to add a collector instance.
7. If needed, select the system in which you want to add a collector instance.

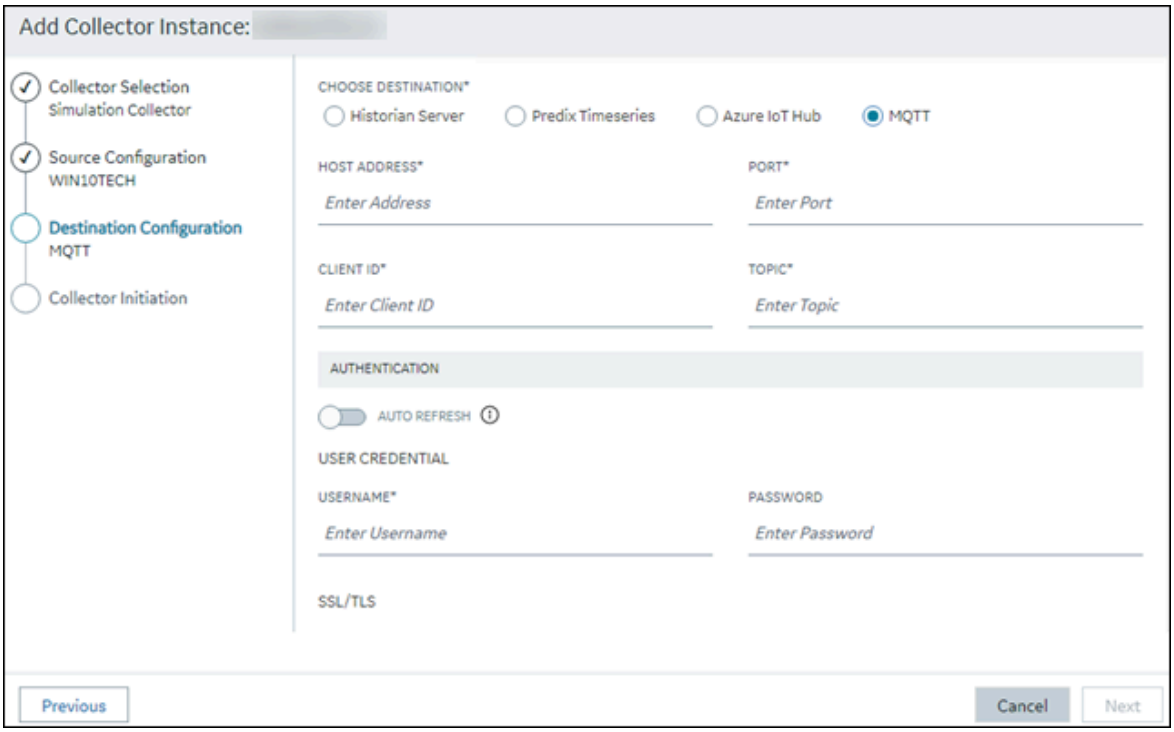


8. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

9. In the **COLLECTOR TYPE** field, select a collector type, and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
10. Select **Next**.
    The **Source Configuration** section appears.
11. As needed, enter values in the available fields.
12. Select **Next**.
    The **Destination Configuration** section appears.



13. Select **Azure IoT Hub**, and provide values as described in the following table.

Field	Description
DEVICE CONNECTION STRING	Identifies the Azure IoT device to which you want to send data. Enter the primary connection string value that you have noted down in step 3.

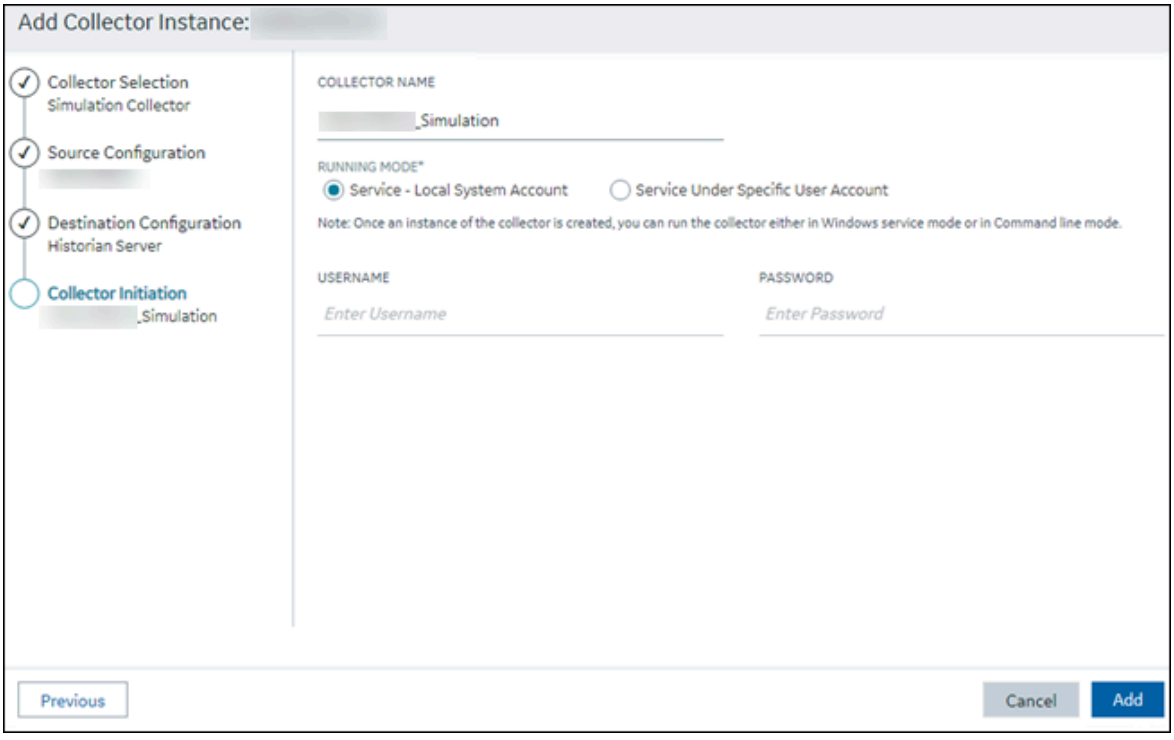
Field	Description
TRANSPORT PROTOCOL	The protocol that you want to use to send data to Azure IoT Hub. Select one of the following options: ◦ HTTP ◦ MQTT ◦ AMQP ◦ MQTT_OVER_WEBSOCKETS ◦ AMQP_OVER_WEBSOCKETS For information on which protocol to use, refer to Protocols and Port Numbers *(on page 1345)*.
PROXY	Identifies the URL of the proxy server to be used for both the authentication process and for sending data. If the collector is running on a network where proxy servers are used to access web resources outside of the network, then you must provide the proxy server settings. However, it does not affect the proxy server used by Windows when establishing secure connections. As a result, you must still configure the proxy settings for the Windows user account under which the collector service runs.
PROXY USERNAME	The username to connect to the proxy server.
PROXY PASSWORD	The password to connect to the proxy server.
CHOOSE CONFIGURATION	The type of the configuration to specify the tags whose data you want to collect. Select one of the following options: ◦ **Historian Configuration**: Select this option if you want to add the tags manually *(on page 1077)*. If you select this option, the **CONFIGURATION HISTORIAN SERVER** field appears.

Field	Description
	◦ **Offline Configuration**: Select this option if you want to provide the tag names using the offline configuration *(on page)* file instead of adding tags manually. By default, this file is located in the following location: `<installation folder of Historian>\GE Digital\<collector name>`
CONFIGURATION HISTORIAN SERVER	The host name of the machine from which you want to access Historian Administrator to add the tags manually for the collector. This field appears only if you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field.

The collector instance is created and connected to the Azure IoT Hub device.

14. Select **Next**.

    The **Collector Initiation** section appears.



15. Enter a collector name.

The value that you enter:

- Must be unique.
- Must not exceed 15 characters.
- Must not contain a space.
- Must not contain special characters except a hyphen, period, and an underscore.

16. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
        - iH Security Admins
        - iH Collector Admins
        - iH Tag Admins

    If you choose the first option, you can also configure the collector to start automatically when you start the computer, or, in the case of iFIX collectors, whenever you start iFIX.
17. Select **Add**.
    The collector instance is created.
18. Specify the tags for which you want to collect data.
    - If you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags manually *(on page 1077)*.
    - If you have selected **Offline Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags using the offline configuration file *(on page)*.

    The collector begins sending Historian data to the Azure IoT Hub device that you have created.

Send Data to Google Cloud

1. Download the Google root CA certificate from https://pki.google.com/roots.pem.
2. Create public/private key pairs. Use OpenSSL only for testing purposes.

To send data to a Google Cloud device, you can choose any of the following collectors:

- The iFIX collector
- The MQTT collector

- The ODBC collector
- The OPC Classic DA collector
- The OPC Classic HDA collector
- The OPC UA DA collector
- The OSI PI collector
- The Python Collector
- The Server-to-Server collector
- The Simulation collector
- The Windows Performance collector
- The Wonderware collector

1. Access Google Cloud Platform.
2. Create a project. Note down the project ID.
3. Create a registry.

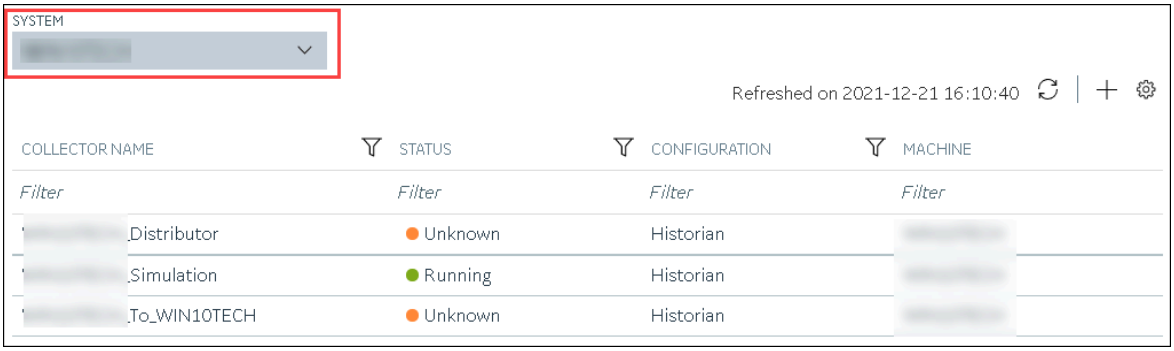
   When you create the registry:
   - Use the MQTT protocol.
   - You can choose to provide a CA certificate.

   Note down the registry ID and the region values.
4. Add a device to the registry.

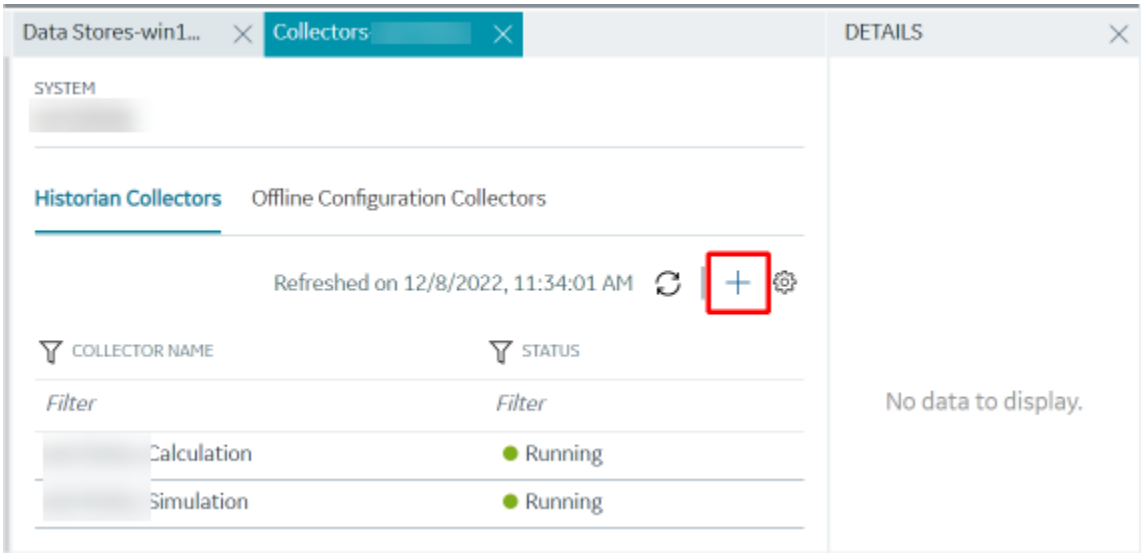
   When you add the device:
   - Allow device communication.
   - Upload the public key or enter the details manually.

   Note down the device ID.
5. Access Configuration Hub *(on page 1055)*.
6. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.

   A list of collectors in the default system appears.
7. If needed, select the system in which you want to add a collector instance.
8. If needed, select the system in which you want to add a collector instance.

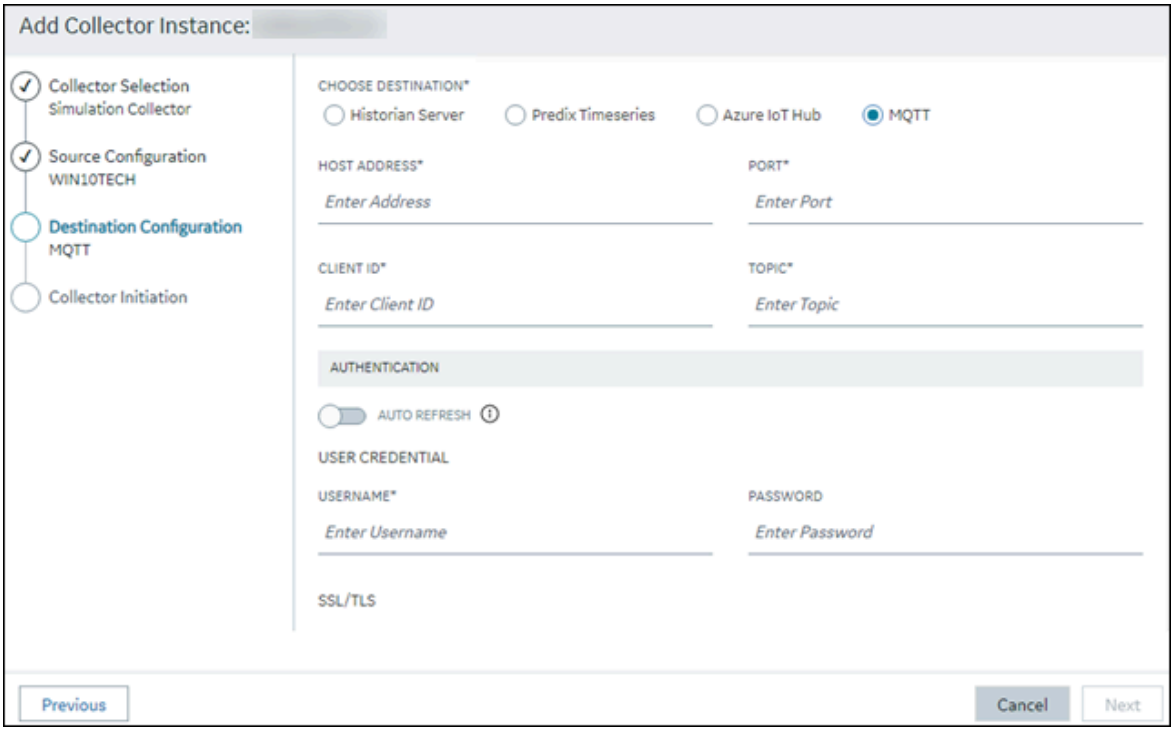


9. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

10. In the **COLLECTOR TYPE** field, select a collector type, and then select **Get Details**.
    The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
11. Select **Next**.
    The **Source Configuration** section appears.
12. As needed, enter values in the available fields.
13. Select **Next**.
    The **Destination Configuration** section appears.



14. Select **MQTT**, and provide values as described in the following table.

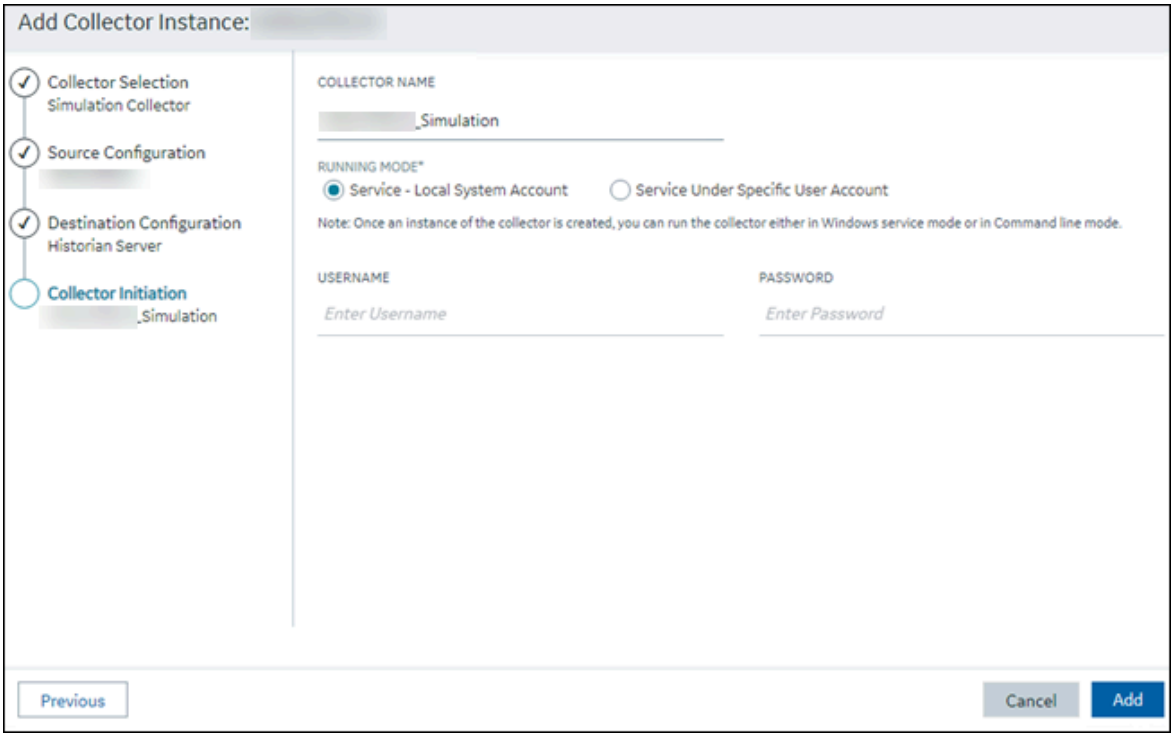
Field	Description
HOST ADDRESS	Enter `mqtt.googleapis.com`. A value is required.
PORT	Enter `8883` or `443`.
CLIENT ID	Enter the ID of the device that you created in the following format: `projects/<project ID>/locations/<cloud region>/registries/<registry ID>/devices/<device ID>`. For example: `projects/mygcpproject/locations/asia-east1/registries/testmqttgcpiot/devices/gcptesting` A value is required and must be unique for an MQTT broker.
TOPIC	Enter `devices/<device ID>/events`.
AUTO REFRESH	Indicates whether you want to automatically refresh the authentication token when it expires. If you switch the toggle off, you must manually

Field	Description
	provide the token as soon as it expires. Google Cloud accepts only those tokens that expire in 24 hours or less; therefore, we recommend that you switch the toggle on.
USERNAME	Enter any value. This value is not used, but only if you enter a value, you can proceed.
PASSWORD	If you have switched the **AUTO REFRESH** toggle on, leave this field blank. Historian generates a JSON Web Token (JWT) and uses it automatically.
CA SERVER ROOT FILE	Enter the path of the Google root CA certificate that you have downloaded.
CLIENT CERTIFICATE	Enter the path to the client certificate.
PRIVATE KEY FILE	Enter the complete path to the private key file. A value is required.
PUBLIC KEY FILE	Enter the path to the public key file. A value is required.
CHOOSE CONFIGURATION	The type of the configuration to specify the tags whose data you want to collect. Select one of the following options: ◦ **Historian Configuration**: Select this option if you want to add the tags manually *(on page 1077)*. If you select this option, the **CONFIGURATION HISTORIAN SERVER** field appears. ◦ **Offline Configuration**: Select this option if you want to provide the tag names using the offline configuration *(on page)* file instead of adding tags manually. By default, this file is located in the following location: `<installation folder of Historian>\GE Digital\<collector name>`

Field	Description
CONFIGURATION HISTORIAN SERVER	The host name of the machine from which you want to access Historian Administrator to add the tags manually for the collector. This field appears only if you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field.

15. Select **Next**.

    The **Collector Initiation** section appears.



16. Enter a collector name.

    The value that you enter:

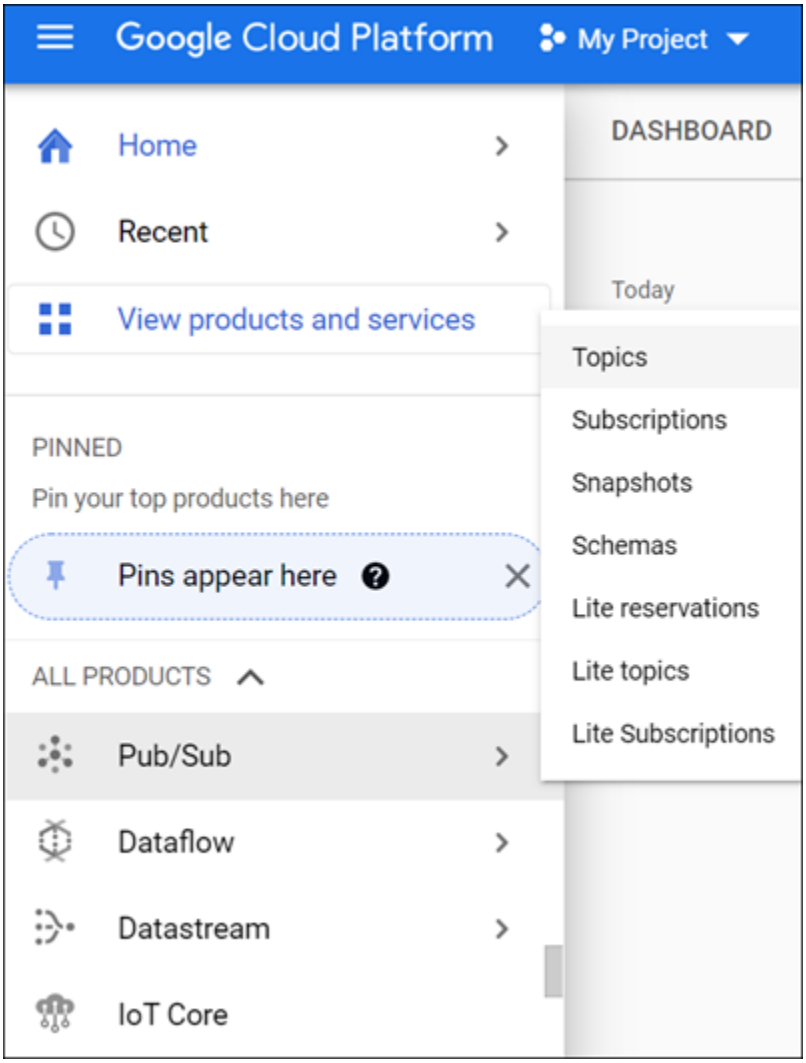
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.

17. In the **RUNNING MODE** field, select one of the following options.

- **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
- **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
  - iH Security Admins
  - iH Collector Admins
  - iH Tag Admins

If you choose the first option, you can also configure the collector to start automatically when you start the computer, or, in the case of iFIX collectors, whenever you start iFIX.

18. Select **Add**.
    The collector instance is created.
19. Access Google Cloud Platform, and select **Pub/Sub > Topics**.



20. Select **Messages > PULL**.
    Messages published to the topic that you have created appear. These messages contain the data sent by the collector instance. You can verify that the message content is correct by selecting **Message body**.

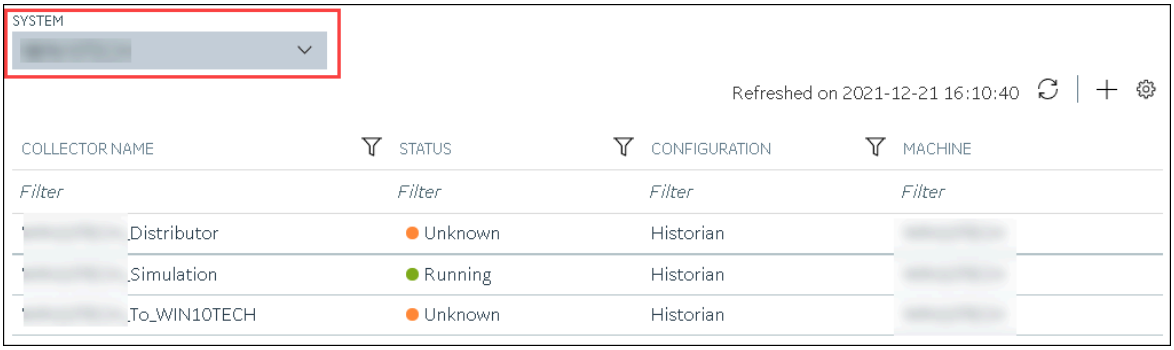
Send Data to Predix Cloud

To send data to Predix Cloud, you can choose any of the following collectors:

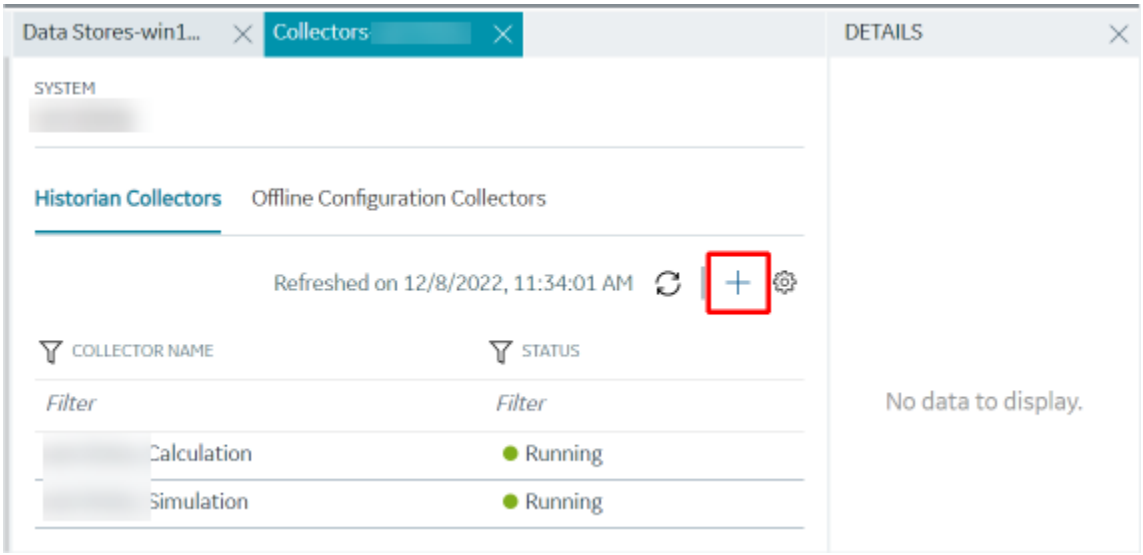
- The iFIX collector
- The MQTT collector
- The ODBC collector
- The OPC Classic DA collector
- The OPC Classic HDA collector

- The OPC UA DA collector
- The OSI PI collector
- The Python Collector
- The Server-to-Server collector
- The Simulation collector
- The Windows Performance collector
- The Wonderware collector

1. Register with the Timeseries service or any UAA service that you want to use. Note down the destination address, URI, client ID, client secret, and the zone ID that you have provided.
2. Access Configuration Hub *(on page 1055)*.
3. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors in the system appears.
4. If needed, select the system in which you want to add a collector instance.

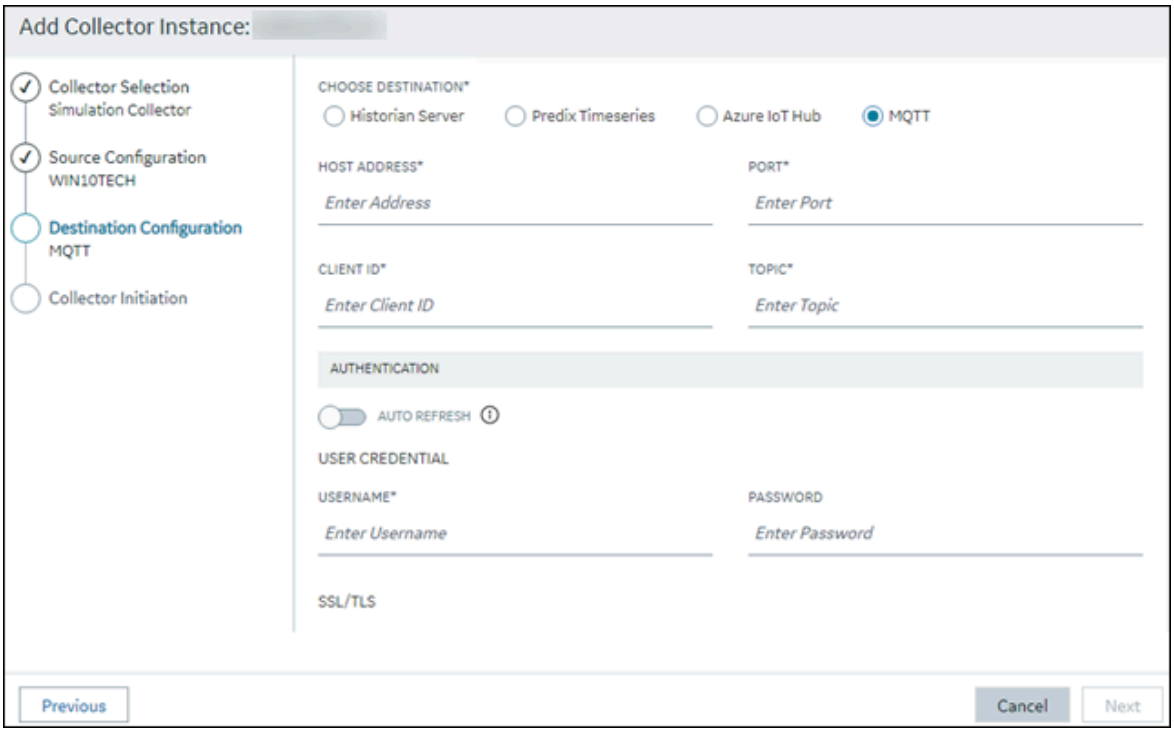


5. In the upper-right corner of the main section, select +.



The **Add Collector Instance: <system name>** window appears, displaying the **Collector Selection** section. The **MACHINE NAME** field contains a list of machines on which you have installed collectors.

6. In the **COLLECTOR TYPE** field, select a collector type (except the File collector and the Server-to-Server collector), and then select **Get Details**.
   The **INSTALLATION DRIVE** and **DATA DIRECTORY** fields are disabled and populated.
7. Select **Next**.
   The **Source Configuration** section appears, populating the hostname of the collector machine.
8. As needed, enter values in the available fields, and then select **Next**.
   The **Destination Configuration** section appears.



9. In the **CHOOSE DESTINATION** field, select **Predix Timeseries**, and then provide values as described in the following table.

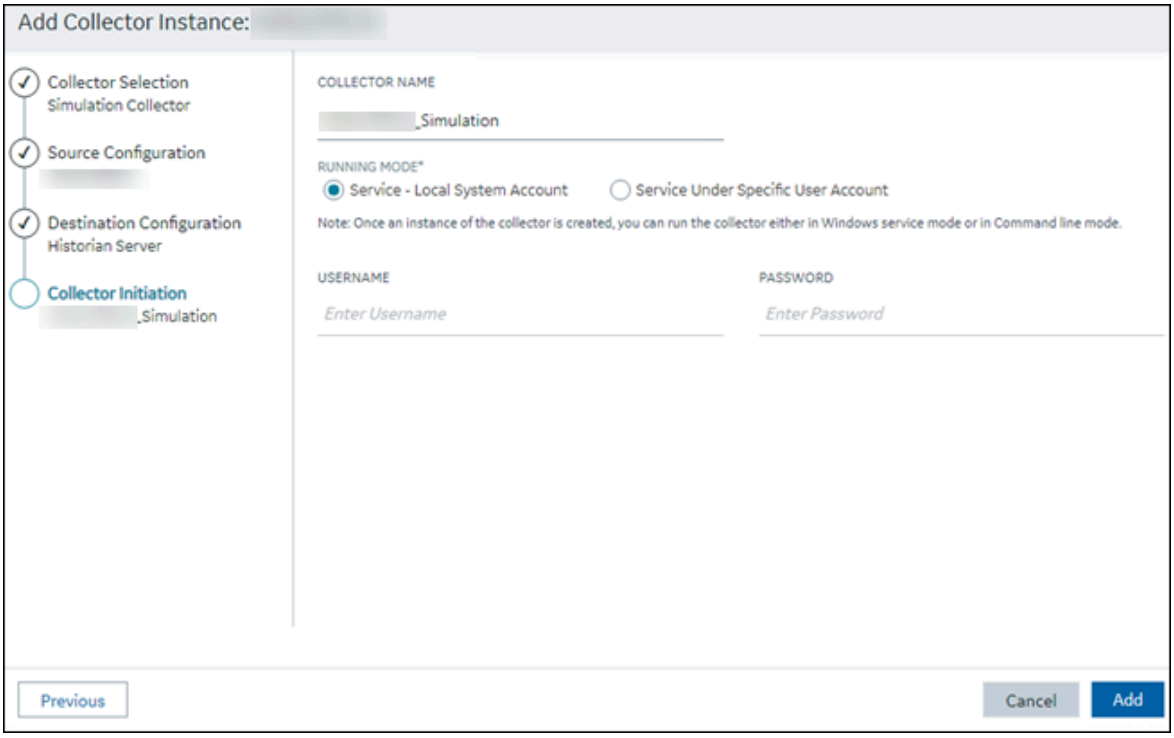
Field	Description
CLOUD DESTINATION ADDRESS	The URL of a data streaming endpoint exposed by the Predix Time Series instance to which you want to send data. Typically, it starts with “wss://”. This value is used as part of the interface name and default tag prefix of the collector. Your Predix Time Series administrator can provide this URL.

Field	Description
IDENTITY ISSUER	The URL of an authentication endpoint for the collector to authenticate itself and acquire necessary credentials to stream to the Predix Time Series. In other words, this is the issuer ID of the Proficy Authentication instance that you want to use to connect to Predix Time Series. Typically, it starts with https:// and ends with "/oauth/token".
CLIENT ID	Identifies the collector when interacting with Predix Time Series. This is equivalent to the username in many authentication schemes. The client must exist in the Proficy Authentication instance identified by the identity issuer, and the system requires that the `timeseries.zones. {ZoneId}.ingest` and `timeseries.zones.{ZoneId}.query` authorities are granted access to the client for the Predix Zone ID specified. Your Predix Time Series administrator can provide this information.
CLIENT SECRET	The secret to authenticate the collector. This is equivalent to the password in many authentication schemes.
ZONE ID	Unique identifier of the instance to which the collector will send data.
PROXY	Identifies the URL of the proxy server to be used for both the authentication process and for sending data. If the collector is running on a network where proxy servers are used to access web resources outside of the network, then you must provide the proxy server settings. However, it does not affect the proxy server used by Windows when establishing secure connections. As a result, you must still configure the proxy settings for the Windows user account under which the collector service runs.
PROXY USERNAME	The username to connect to the proxy server.
PROXY PASSWORD	The password to connect to the proxy server.
DATAPOINT ATTRIBUTES	The attributes or parameters related to a datapoint that you want the collector to collect. Select **Add Attributes** to specify the attributes. You can add maximum five attributes for each collector instance.

Field	Description
CHOOSE CONFIGURATION	The type of the configuration to specify the tags whose data you want to collect. Select one of the following options: ◦ **Historian Configuration**: Select this option if you want to add the tags manually *(on page 1077)*. If you select this option, the **CONFIGURATION HISTORIAN SERVER** field appears. ◦ **Offline Configuration**: Select this option if you want to provide the tag names using the offline configuration *(on page)* file instead of adding tags manually. By default, this file is located in the following location: `<installation folder of Historian>\GE Digital\<collector name>`
CONFIGURATION HISTORIAN SERVER	The host name of the machine from which you want to access Historian Administrator to add the tags manually for the collector. This field appears only if you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field.

10. Select **Next**.

    The **Collector Initiation** section appears.



11. Enter a collector name.
    The value that you enter:
    - Must be unique.
    - Must not exceed 15 characters.
    - Must not contain a space.
    - Must not contain special characters except a hyphen, period, and an underscore.
12. In the **RUNNING MODE** field, select one of the following options.
    - **Service - Local System Account**: Select this option if you want to run the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
    - **Service Under Specific User Account**: Select this option if you want to run the collector as a Windows service using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields. If you have enabled the **Enforce Strict Collector Authentication** option in Historian Administrator, you must provide the credentials of a user who is added to at least one of the following security groups:
      - iH Security Admins
      - iH Collector Admins
      - iH Tag Admins

    If you choose the first option, you can also configure the collector to start automatically when you start the computer, or, in the case of iFIX collectors, whenever you start iFIX.
13. Select **Add**.
    The collector instance is created.
14. Specify the tags for which you want to collect data.
    - If you have selected **Historian Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags manually *(on page 1077)*.
    - If you have selected **Offline Configuration** in the **CHOOSE CONFIGURATION** field, specify the tags using the offline configuration file *(on page)*.

    The collector begins sending Historian data to Predix Timeseries.

Protocols and Port Numbers

The following table provides a list of protocols that are available to send data to Azure IoT Hub, guidelines on which protocol to choose, and the port number that each protocol uses.

Protocol	When to Use	Port Number
HTTP	Use this protocol if the data that you want to send is not large and/or the default ports for the other protocols are not available.	80
MQTT	MQTT is lightweight compared to AMQP, and is widely used. Use this protocol if you want to send data using low bandwidth and/or you do not want to connect to multiple devices using the same connection.	8883
AMQP	AMQP is more reliable compared to other protocols. It sends data in batches, and hence, the network traffic is less compared to that of MQTT. Use this protocol if you want to send a large amount of data from multiple collectors frequently.	5671
MQTT over web sockets	MQTT is lightweight compared to AMQP, and is widely used. In addition, communication using web sockets is more reliable and secure. Use this protocol if you want to send data using low bandwidth and securely.	443
AMQP over web sockets	AMQP is more reliable compared to other protocols. It sends data in batches, and hence, the network traffic is less compared to that of MQTT. In addition, communication using web sockets is more reliable and secure. Use this protocol if you want to send a large amount of data from multiple collectors frequently and securely.	443

Managing Collector Instances

About Managing Collectors Using Configuration Hub

Collectors are used to collect data from various sources and send it to Historian. For a list of collectors and their usage, refer to About Historian Data Collectors *(on page)*.

After you install collectors and Remote Management Agent, the following artefacts will be available:

- **Executable files:** These files are required to add a collector instance.
- **Instances of the following collectors:**
  - The iFIX collector
  - The iFIX Alarms & Events collector
  - The OPC Classic Data Access collector for CIMPLICITY
  - The OPC Classic Alarms and Events collector for CIMPLICITY

  These instances will be created only if iFIX and/or CIMPLICITY are installed on the same machine as the collectors.
- **The Remote Collector Management agent:** Provides the ability to manage collectors remotely.

You can then add a collector instance. This section describes how to add a collector instance using Configuration Hub *(on page 1076)*. You can also add a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

Access a Collector Instance

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears, displaying the following columns:

Column	Description
COLLECTOR NAME	The name of the collector instance. If you select the link in this column, the details of the collector instance appears.
STATUS	The status of the collector. Contains one of the following values: ◦ **Started** ◦ **Stopped** ◦ **Running** ◦ **Paused**
CONFIGURATION	The source of the tag configuration for the collector. Contains one of the following values: ◦ **HISTORIAN**: Indicates that tags are configured using Historian Administrator. ◦ **OFFLINE**: Indicates that tags are configured using an offline configuration *(on page)* file.

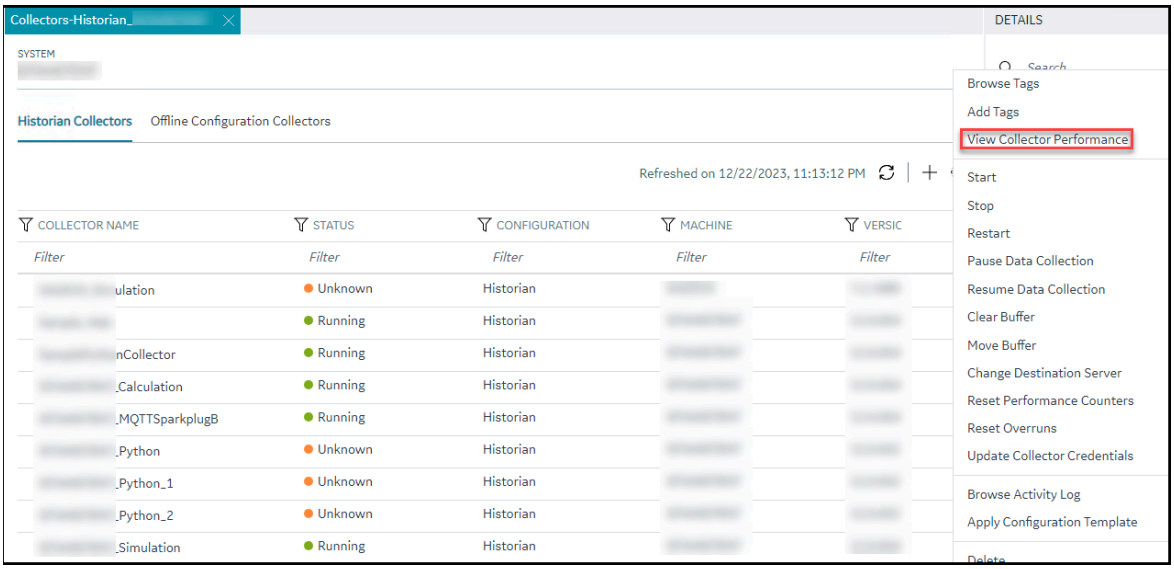
Column	Description
MACHINE	The name of the machine on which the collector is installed.
VERSION	The version number of the collector.
REPORT RATE	The average rate at which the collector is sending data. This is a general indicator of load on the collector.
OVERRUNS	The total number of data events not collected. In normal operation and under normal conditions, this value should always be zero. If the value is not zero, which indicates that data is being lost, you must take steps to reduce peak load on the system by increasing the collection interval.
COMPRESSION	The effectiveness of collector compression. If the value is low, you can increase the compression deadbands to pass fewer values and thus increase the effect of compression.
OUT OF ORDER	The total number of out-of-order samples for the collector.
REDUNDANCY	Indicates whether collector redundancy is enabled, which decreases the likelihood of lost data due to soft- ware or hardware failures. For information, refer to About Collector Redundancy *(on page)*.
TAG COUNT	The number of tags for which the collector collects data.
COMMENTS	The comments that you have entered for the collector.

Tip:
You can also add, reorder, and remove columns from the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

3. Select the row containing the collector whose details you want to access.
   The details of the collector appear in the **DETAILS** section.

Note:
If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **Details**.

4. If you want to access the collector performance, right-click the collector (or select ⋯), and then select **View Collector Performance**.



The **Collector Performance** section appears, displaying the following graphs:

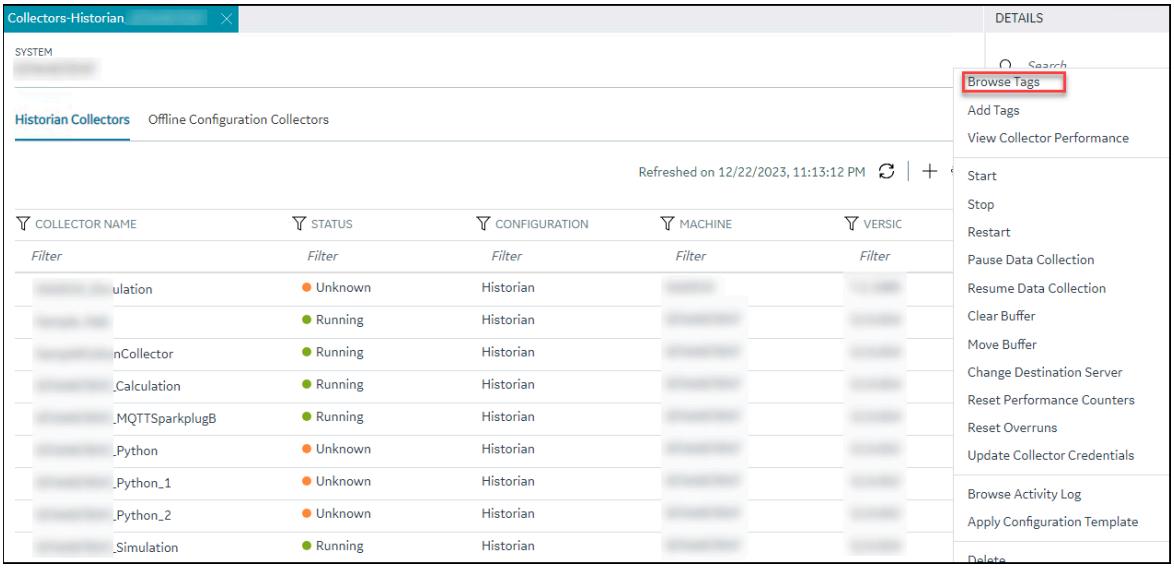
- **REPORT RATE**: The rate at which the collector collects data.
- **TOTAL EVENTS REPORTED**: The total number of events reported to the Historian archive from the collector. This number may not match the total events collected due to collector compression.
- **STATUS**: The status of the collector plotted at regular intervals.
- **COLLECTOR COMPRESSION**: The collector compression (in percentage) applied to tag values plotted at regular intervals.
- **OUT OF ORDER**: The number of samples that have been received out of sequence. Even though data is still stored, a steadily increasing number of out-of-order events indicates a problem with data transmission that you should investigate. For example, a steadily increasing number of out-of-order events when you are using the OPC Collector means that there is an out-of-order between the OPC server and the OPC collector. This may also cause an out-of-order between the OPC collector and the data archiver but that is not what this graph indicates.
- **OVERRUNS**: The number of overruns in relation to the total events collected. Overruns are a count of the total number of data events not collected on their scheduled polling cycle. An overrun occurs when the data source is changing tag values faster than the collector collecting values, which causes it to consistently remain behind the archiver updates. It implies that the collector is running against the hardware and/or network limits and you may consider partitioning the tags into two or more sets, each with separate collector instances.

In a normal operation, this value should be zero. You may be able to reduce the number of overruns on the collector by increasing the tag collection intervals (per tag).

- **MINIMUM EVENT RATE**: Specifies the minimum number of data samples per minute sent to the archiver from all the collector instance.
- **TOTAL EVENTS COLLECTED**: The total number of events collected from the data source by the collector instance.
- **MAXIMUM EVENT RATE**: Specifies the maximum number of data samples per minute sent to the archiver from all the collector instance.

Access the Tags in a Collector Instance

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.
3. Right-click the collector instance whose tags you want to access (or select ⋯), and then select **Browse Tags**.



   A list of tags for which the collector instance collects data appears.
4. To narrow down your search results, select **Search**, enter the search criteria, and then enter **Search**.
   You can add more search criteria by selecting **Add Attribute**.
   You can enter a name or a value partially or use the wildcard character asterisk (*).
   The list of tags are filtered based on the search criteria.

Add a Collector Instance

Before you begin using a collector, you must add an instance of the collector. You can add multiple instances of the same collector or instances of multiple collectors. To add multiple instances of a collector, perform the steps once again.

You can add and configure the following types of collector instances:

- The Calculation collector *(on page 1198)*
- The CygNet collector *(on page 1201)*
- The File collector *(on page 1205)*
- The HAB collector *(on page 1208)*
- The iFIX collector *(on page 1224)*
- The MQTT collector *(on page 1229)*
- The MQTT Sparkplug B collector *(on page 1238)*
- The ODBC collector *(on page 1246)*
- The OPC Classic Alarms and Events collector *(on page 1251)*
- The OPC Classic DA collector *(on page 1253)*
- The OPC Classic HDA collector *(on page 1259)*
- The OPC UA DA collector *(on page 1263)*
- The OSI PI collector *(on page 1268)*
- The OSI PI distributor *(on page 1272)*
- The Server-to-Server collector *(on page 1278)*
- The Server-to-Server distributor *(on page 1282)*
- The Simulation collector *(on page 1286)*
- The Windows Performance collector *(on page 1290)*
- The Wonderware collector *(on page 1294)*

Enable MTLS Security for Collectors

Mutual TLS (MTLS) protocol is a secure and strong authentication mechanism. Using this protocol, you can also encrypt the data between Historian Server and Collectors.

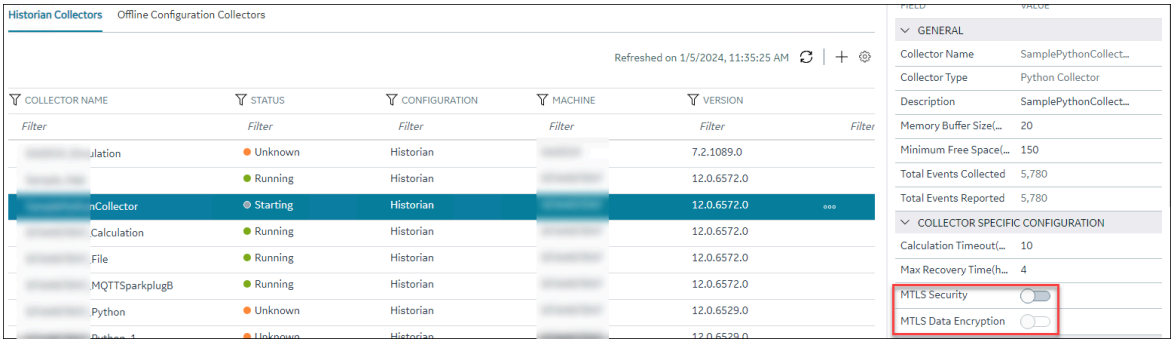
Ensure that you have configured certificate-based security.

This topic describes how to enable MTLS security and encrypt data for collectors.

Note:
MTLS Security and **MTLS Data Encryption** are not applicable to the File collector.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the default system appears.
3. Select the row containing the collector for which you want to enable **MTLS Security** and **MTLS Data Encryption**.
   The details of the collector appear in the **DETAILS** section.

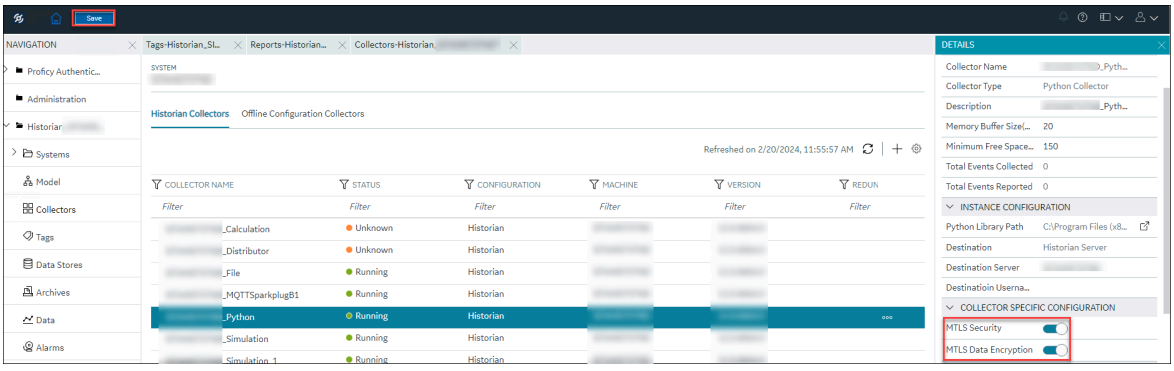
> **Note:**
> If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **Details**.



4. In the **COLLECTOR SPECIFIC CONFIGURATION** section, enable **MTLS Security**.

> **Note:**
> You can enable **MTLS Security** and **MTLS Data Encryption** only if the collector is running.

5. After you enable **MTLS Security**, enable **MTLS Data Encryption**.



6. In the upper-right corner, select **Save**.
   You will be prompted to restart the collector.

7. To apply the changes, select **Restart Now**.

   If you select **Restart Later**, a notification appears in the **DETAILS** section, stating that the selected collector instance needs a restart.

Modify a Collector Instance

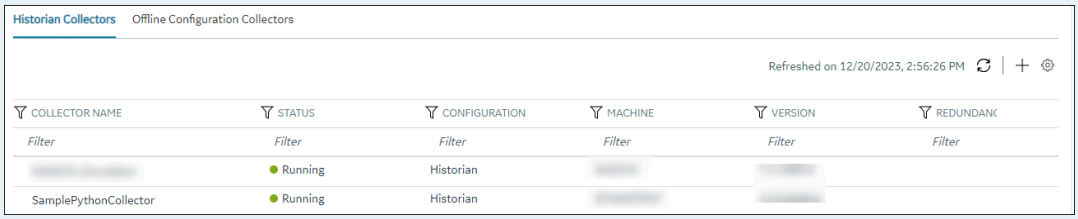
This topic describes how to modify a collector instance using Configuration Hub. You can also modify a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

Note:

- If the status of a collector instance in unknown, you cannot modify it.
- You cannot modify the instance of an offline collector.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

   Tip:
   You can filter the collectors by the system name.

3. Select the collector instance that you want to modify.
   The details of the collector appear in the **DETAILS** section.

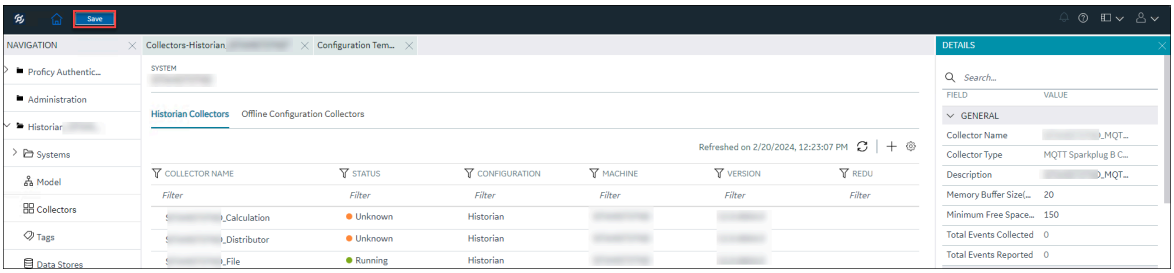
   Tip:
   If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **Details**.

4. As needed, modify values in the available fields *(on page 1298)*.

Note:

- You cannot modify the destination of a collector.
- For collectors earlier than version 9.0:
  - You cannot modify the details in the **INSTANCE CONFIGURATION** section.
  - Some of the details, such as the collector type, do not appear.

5. After you modify the values, in the upper-left corner of the page, select **Save**.



Based on the values that you modified, you might be prompted to restart the collector. For the modifications to take effect, you must restart the collector.

6. Select **Restart Now**.
   The collector instance restarts and the modifications take effect.

   If you select **Restart Later**, a notification appears in the **DETAILS** section, stating that the selected collector instance needs a restart.

Add a Comment to a Collector Instance

This topic describes how to add a comment to a collector instance.

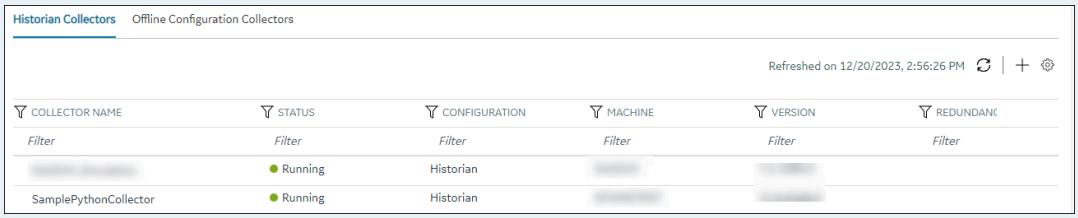
Note:

- You cannot modify or delete comments.
- You cannot add comments to offline collectors.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

Tip:

You can filter the collectors by the system name.



3. Select the collector instance to which you want to add a comment.
   The details of the collector appear in the **DETAILS** section, along with a list of comments at the end.

Tip:

If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **Details**.

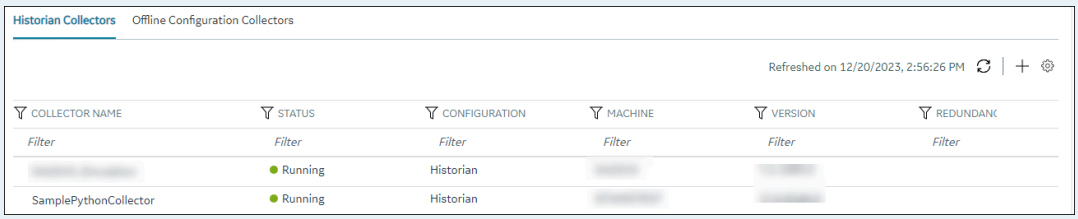
4. In the **DETAILS** section, in the text box below **Comments**, enter your comment, and then select **Add Comment**.
   The comment is added to the collector instance.

Access a Comment on a Collector Instance

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

Tip:

You can filter the collectors by the system name.



3. Select the collector instance whose comments you want to access.

The details of the collector appear in the **DETAILS** section, along with a list of comments at the end.

> **Tip:**
>
> If the **DETAILS** section does not appear, in the upper-right corner of the page, select , and then select **Details**.

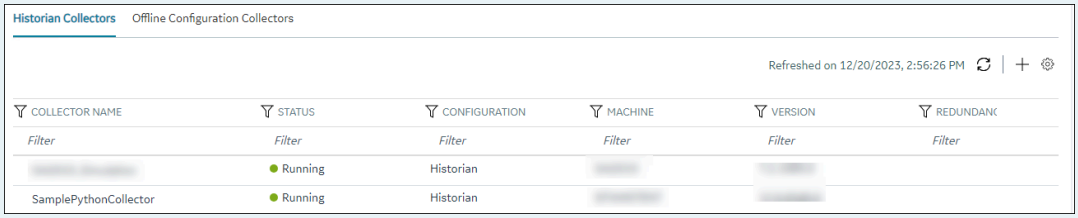
4. To access comments in full screen, select . If you want to search for a comment, enter the search criteria in the **Search** field. You can also filter the comments based on a date and time range by selecting the values in the **FROM** and **TO** fields.
   The comments are filtered based on the search criteria.

Start a Collector

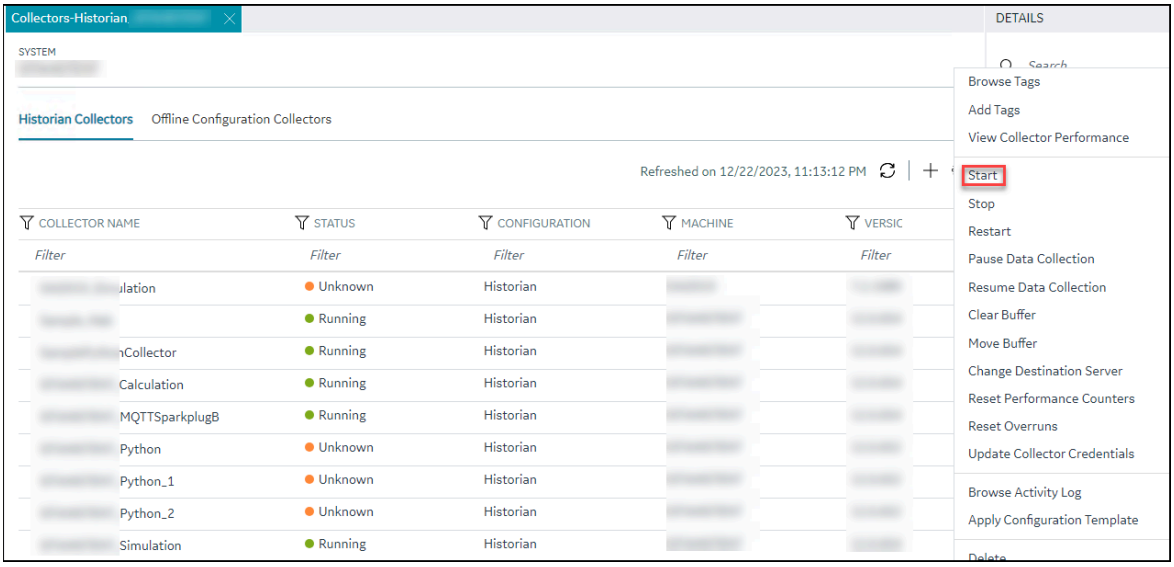
You can start a collector using one of the following options:

- **Service**: Select this option if you want to start the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
- **Command Line**: Select this option if you want to start the collector at a command prompt using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

> **Tip:**
>
> You can filter the collectors by the system name.
>
> 
>

3. Right-click the collector instance that you want to start (or select), and then select **Start**.



The **Start: <collector name>** window appears.

4. Under **RUNNING MODE**, select one of the following options:
   - **Service**: Select this option if you want to start the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
   - **Command Line**: Select this option if you want to start the collector at a command prompt using a specific user account. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.
5. Select **Start**.
   The collector is started, and the data collection begins. The status of the collector in the **Collectors** section changes to Starting and then to Running. If, however, the connection fails, the status changes to Unknown.

> **Note:**
> If auto-refresh is not enabled, refresh the collector manually.

Stop a Collector

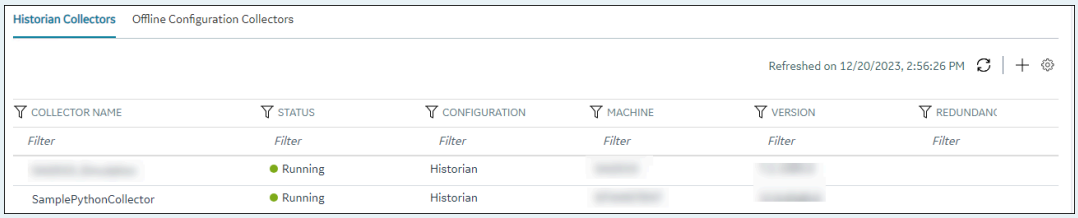
When you stop a collector, the collector stops collecting data, and it is disconnected from the destination. If, however, you want the collector to remain connected to the destination, you can instead pause data collection *(on page 1360)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.

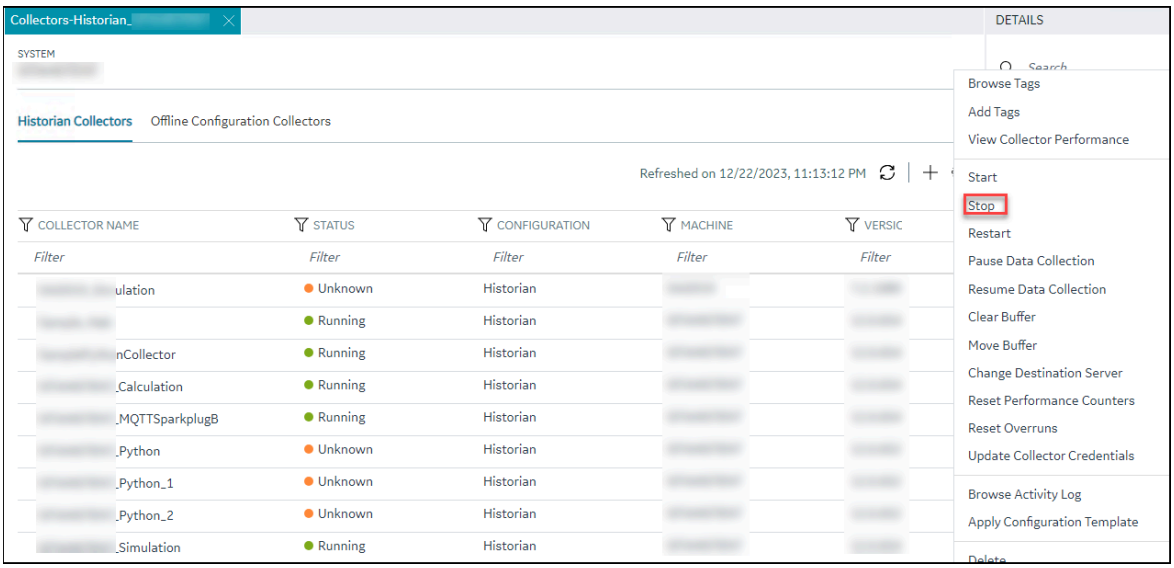
A list of collectors appears.

Tip:

You can filter the collectors by the system name.



3. Right-click the collector instance that you want to stop (or select), and then select **Stop**.



The **Stop: <collector name>** window appears. The **COLLECTOR MACHINE** and **CURRENT RUNNING MODE** fields are populated and disabled.

4. If the collector is running in the command-line mode, enter values in the **USERNAME** and **PASSWORD** fields.
5. Select **Stop**.

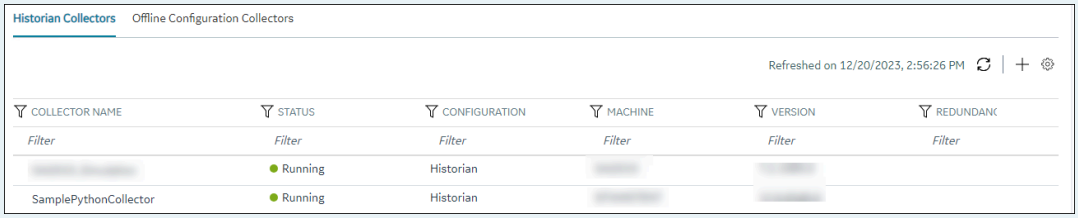
   The collector is stopped, and the data collection is paused. The status of the collector in the **Collectors** section changes to Stopped.

Restart a Collector

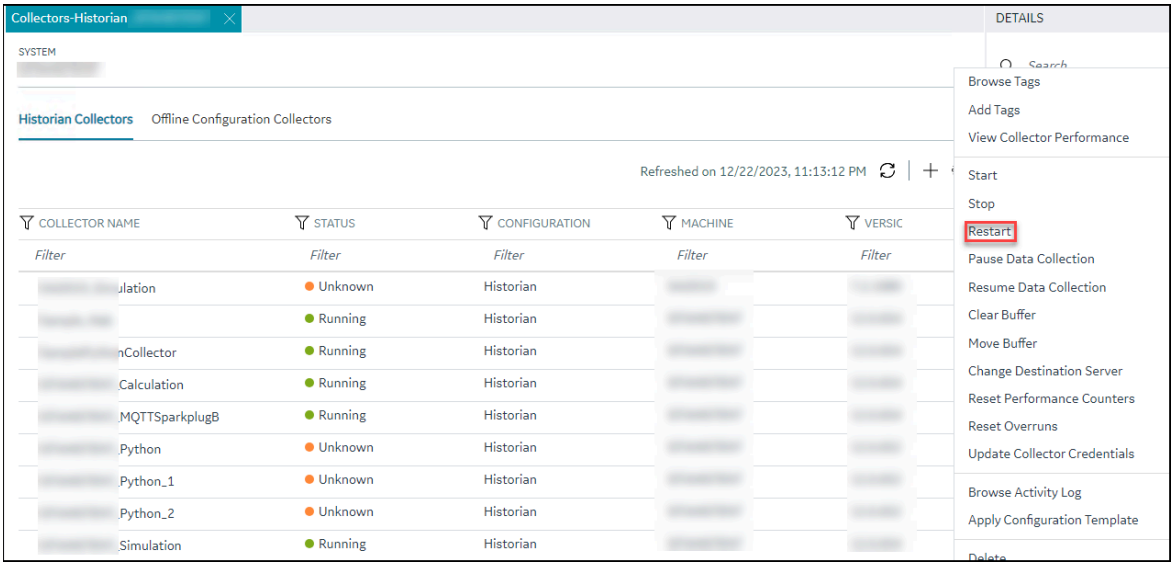
You can restart a collector to stop and start it again. You can restart a collector only if it is running. However, when you modify a collector instance, based on the values you modify, you will be prompted

and given the option to restart the collector before you save the modifications. Without restarting, the modifications will not take effect.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

> **Tip:**
> You can filter the collectors by the system name.
>
> 
>

3. Right-click the collector instance that you want to restart (or select ⋯), and then select **Restart**.



   The **Restart: <collector name>** window appears. The **COLLECTOR MACHINE** and **CURRENT RUNNING MODE** fields are populated and disabled.
4. If the collector is running in the command-line mode, enter values in the **USERNAME** and **PASSWORD** fields.
5. Select **Restart**.
   The collector is restarted, and the data collection is resumed.

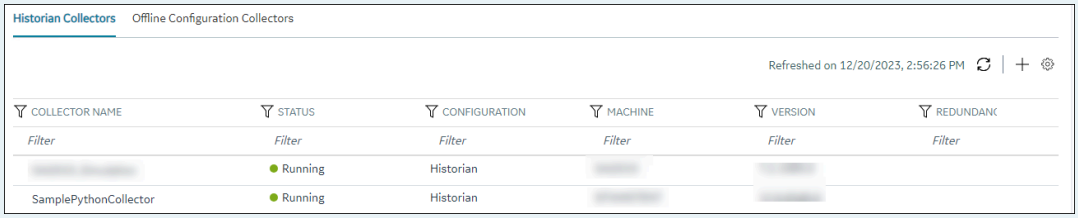
Pause the Data Collection of a Collector

When you pause data collection, the collector stops collecting the data. However, the collector is still connected to the destination. If you want to disconnect the collector from the destination, stop the collector *(on page 1357)*.

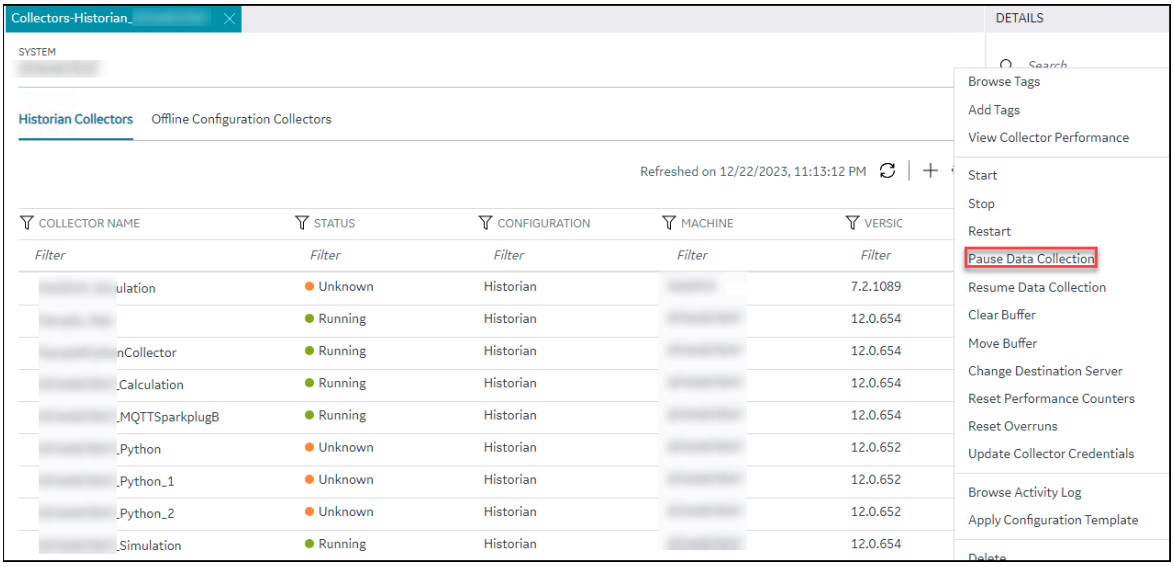
Note:
You cannot pause the data collection of an offline collector.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors appears.

Tip:
You can filter the collectors by the system name.



3. Right-click the collector instance for which you want to pause data collection (or select ⋯), and then select **Pause Data Collection**.



A message appears, asking you to confirm whether you want to pause data collection.

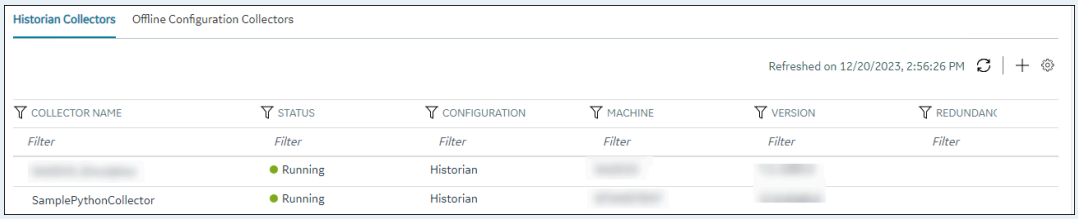
4. Select **Pause**.

   The data collection is paused, and the collector is stopped.

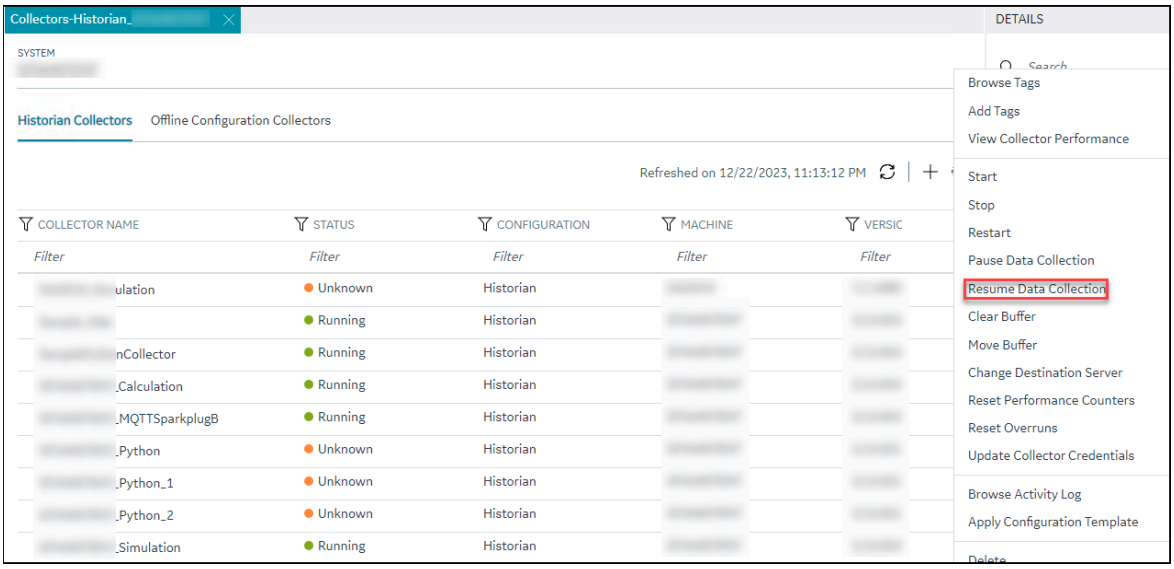
Resume the Data Collection of a Collector

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.

   A list of collectors appears.

> **Tip:**
>
> You can filter the collectors by the system name.
>
> 
>

3. Right-click the collector instance for which you want to resume data collection (or select ⋯), and then select **Resume Data Collection**.



A message appears, asking you to confirm whether you want to resume data collection.

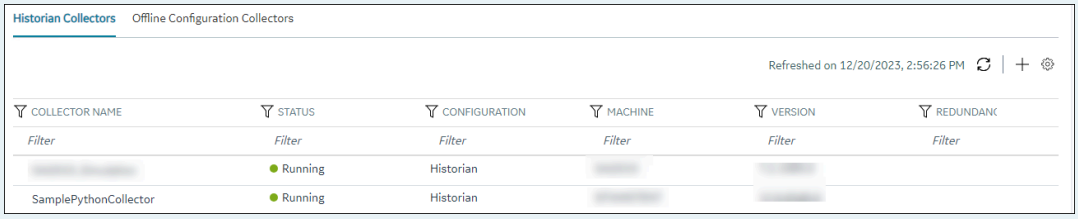
4. Select **Resume**.

   The collector is started, and the data collection is resumed.

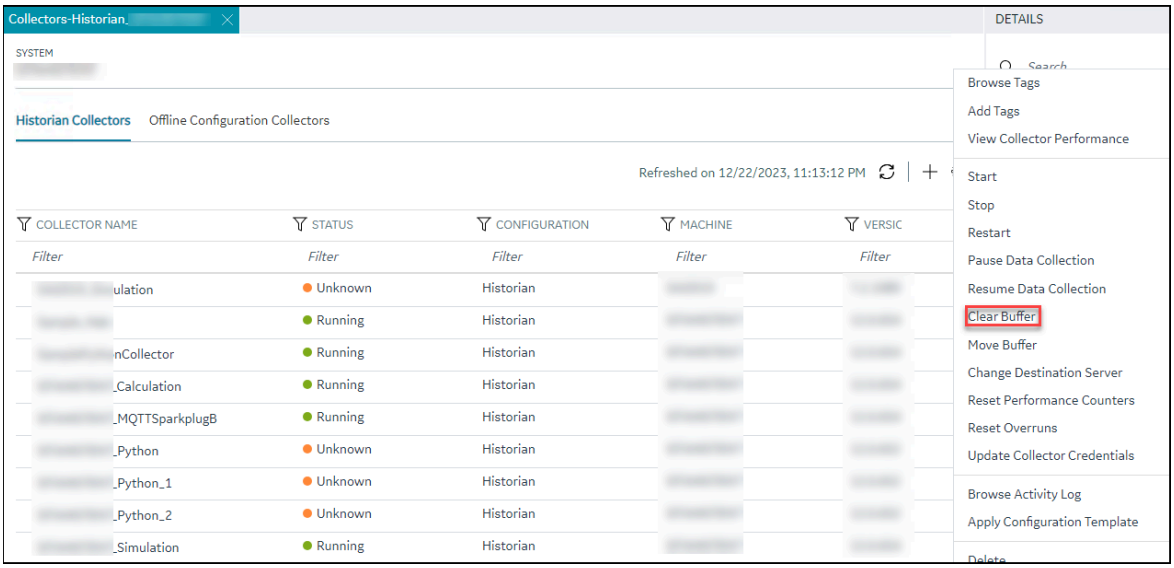
Delete the Buffer Files of a Collector

When you delete buffer files, the collector is stopped, and after the buffer files are deleted, it is restarted.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

> **Tip:**
> You can filter the collectors by the system name.
>
> 
>

3. Right-click the collector instance whose buffer files you want to delete (or select ⋯), and then select **Clear Buffer**.



   A message appears, asking you to confirm that you want to clear the buffer files.
4. Select **Clear**.
   The **Clear Buffer: <collector name>** window appears.
5. If the collector is running in the command-line mode with a specific user account, enter values in the **USERNAME** and **PASSWORD** fields.

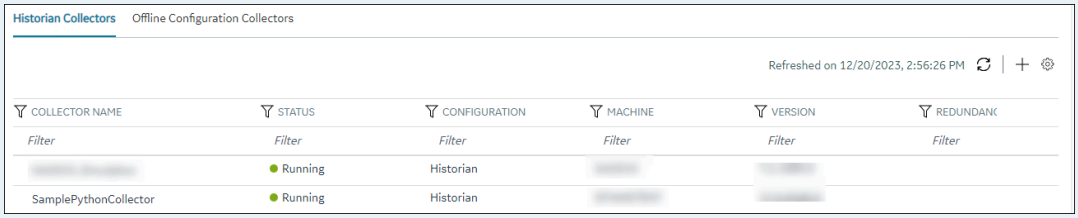
6. Select **Clear**.
   The buffer files of the collector are deleted.

Move the Buffer Files of the Collector

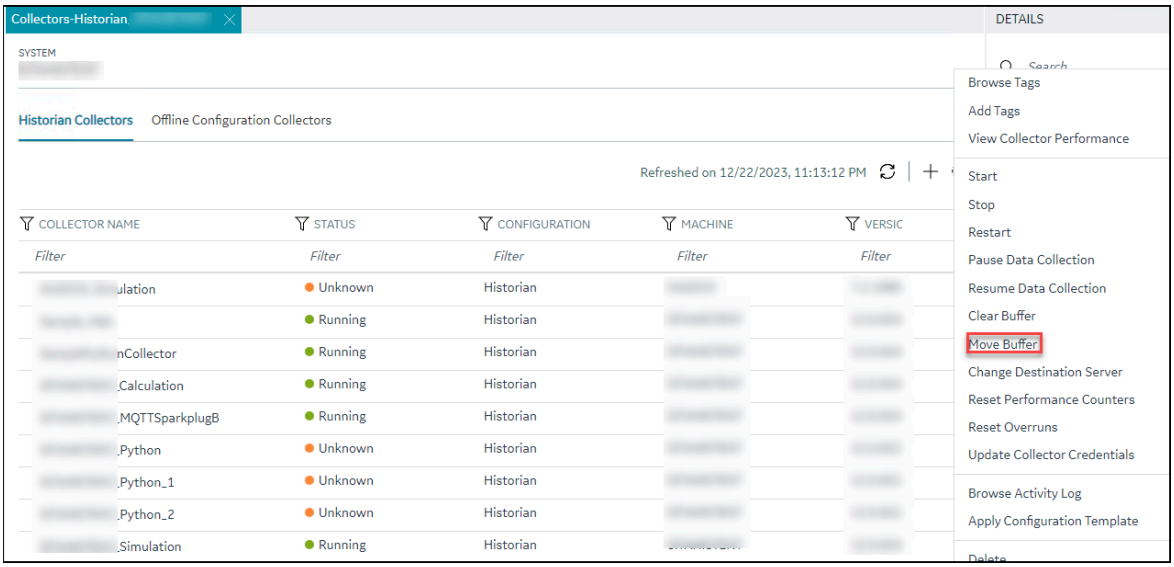
We recommend that you move the buffer files to a new folder within the same drive. You cannot move files to a folder on a network shared drive.

When you move buffer files, the collector is stopped, and after the buffer files are moved, it is restarted.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

> **Tip:**
> You can filter the collectors by the system name.
>
> 
>

3. Right-click the collector instance whose buffer files you want to move (or select ⋯), and then select **Move Buffer**.



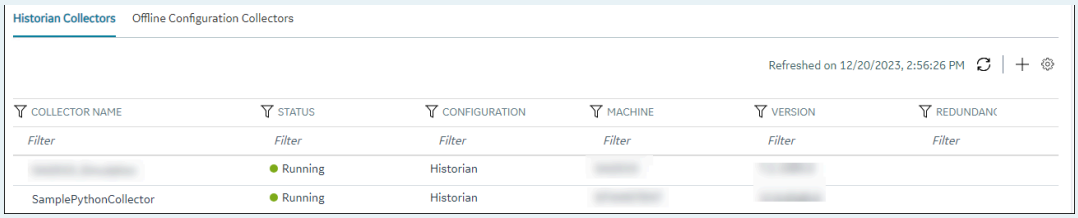
The **Move Buffer: <collector name>** window appears. The **CURRENT LOCATION**, **COLLECTOR MACHINE**, and **RUNNING MODE** fields are populated and disabled.

4. In the **TARGET LOCATION** field, enter the path of the folder to which you want to move the buffer files.
5. If the collector is running in the Windows service mode, select **Move Buffer**. If the collector is running in the command-line mode, enter values in the **USERNAME** and **PASSWORD** fields, and then select **Move Buffer**.
   The buffer files are moved, and the collector is started.

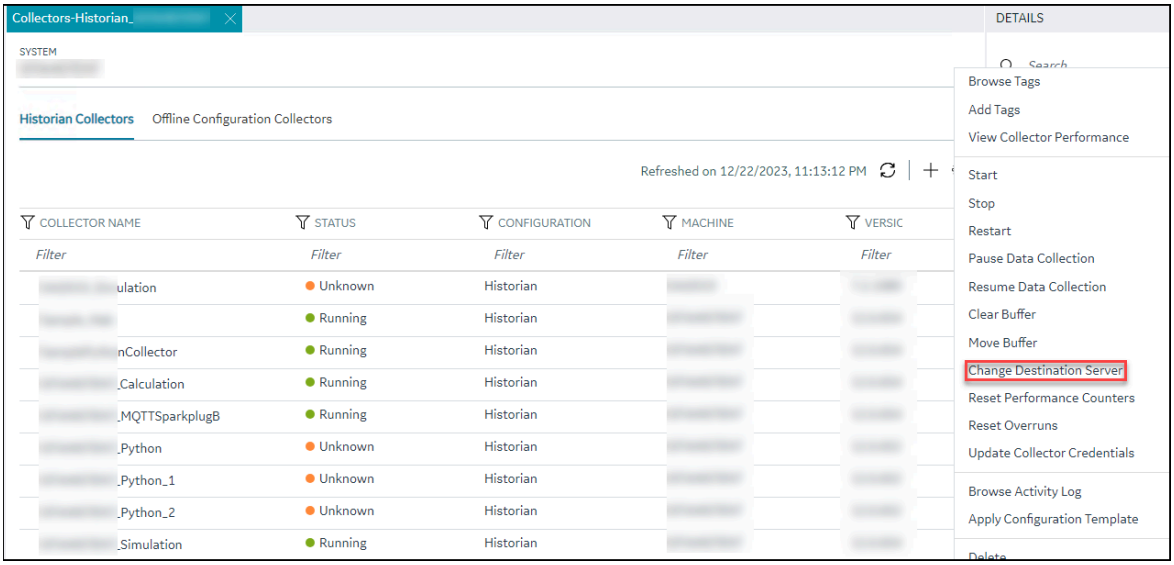
Change the Destination Server of a Collector

1. Ensure that Historian is installed on the new destination server to which you want the collector to send data.
2. Ensure that the collector whose destination server you want to change is running.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.

> **Tip:**
> You can filter the collectors by the system name.
>
> 
>

3. Right-click the collector instance whose destination server you want to change (or select ⋯), and then select **Change Destination Server**.



The **Change Destination Server: <collector name>** window appears. The **COLLECTOR MACHINE**, **CURRENT RUNNING MODE**, and **CURRENT DESTINATION SERVER** fields are populated and disabled.

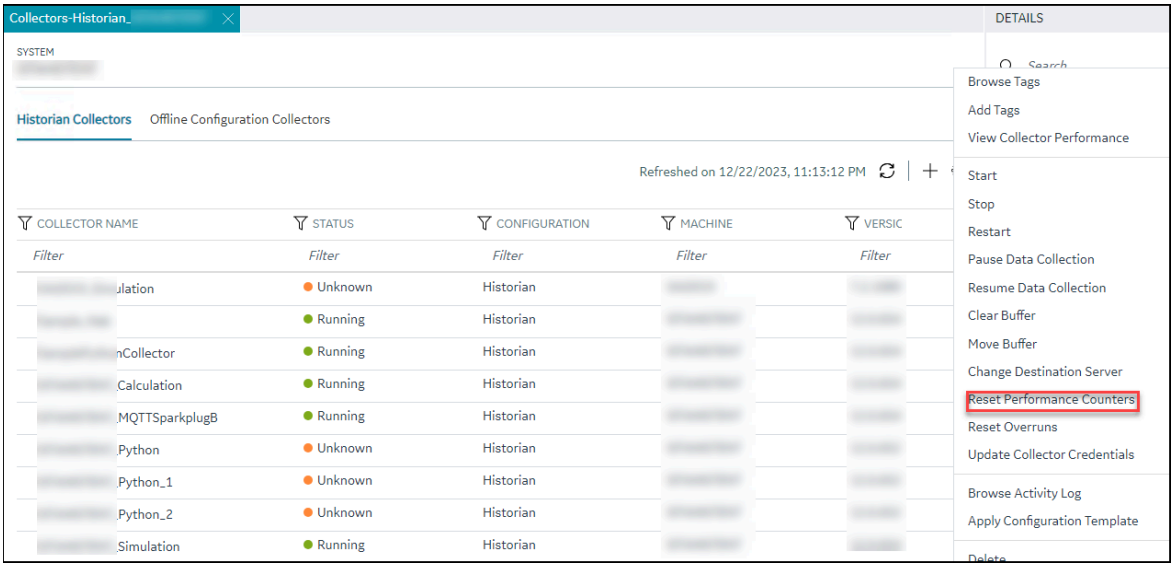
4. In the **NEW RUNNING MODE** field, select one of the following options:
   - **Service**: Select this option if you want to start the collector as a Windows service using the credentials of the local user (that is, the currently logged-in user). If you select this option, the **USERNAME** and **PASSWORD** fields are disabled.
   - **Command Line**: Select this option if you want to start the collector in the command-line mode. If you select this option, you must enter values in the **USERNAME** and **PASSWORD** fields.
5. In the **NEW DESTINATION SERVER** field, enter the host name or IP address of the new destination server to which you want the collector to send data.
6. In the **USERNAME** and **PASSWORD** fields, enter the credentials to access the new destination server.
7. Select **Change Server**.
   The destination server of the collector is changed, and the collector is stopped.

1. Update the network message compression of the collector by modifying the collector instance using Configuration Hub.
2. Reconfigure the collector properties using Historian Administrator.
3. Restart the collector *(on page 1358)*.

Reset Performance Counters

This topic describes how to reset performance counters for a collector. Performance counters are used to monitor the performance of Historian components. You can reset it to zero if you want to reset the performance counters.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears, displaying the details.
3. Select the row containing the collector whose details you want to access.
4. Right-click the collector (or select), and then select **Reset Performance Counters**.



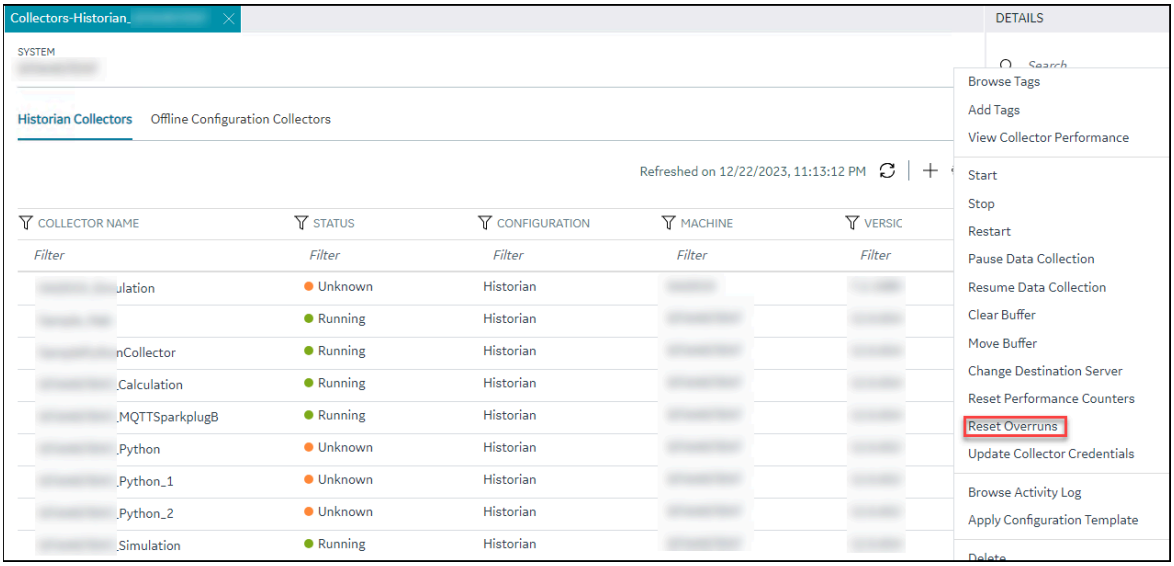
   A confirmation window appears, prompting you whether or not to reset the performance counters to zero.
5. Select **Reset**.
   All the performance counters are reset, including overruns.

Reset Overruns

This topic describes how to reset overruns count. Overruns are a count of the total number of data events not collected on their scheduled polling cycle. In normal operation, this value should be zero, if not, you can reset it to zero.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears, displaying the details.
3. Select the row containing the collector whose details you want to access.

4. Right-click the collector (or select ⋯), and then select **Reset Overruns**.

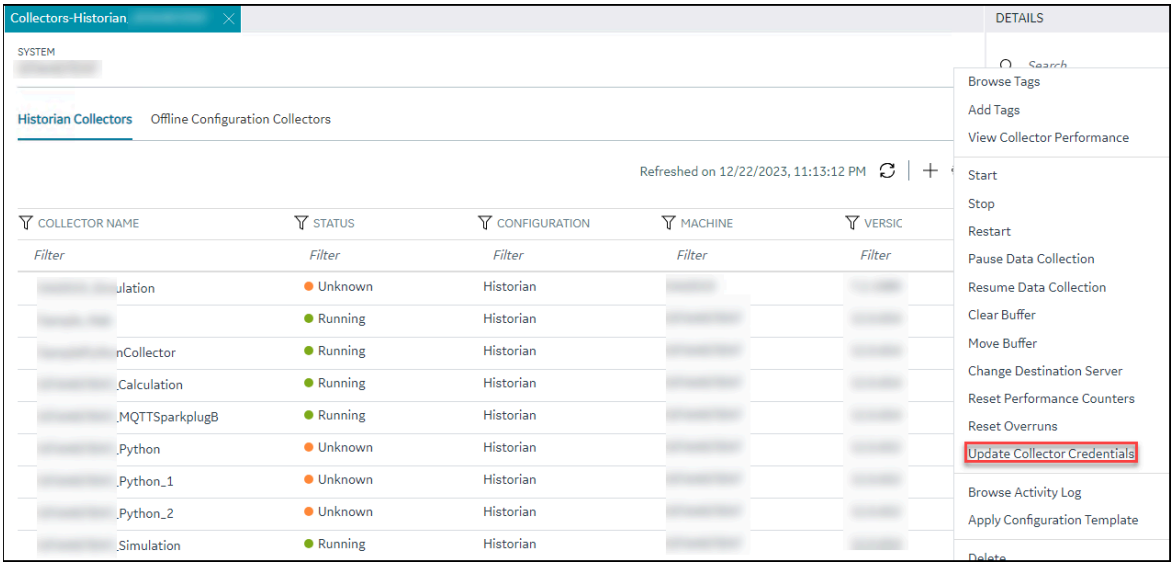


   A confirmation window appears, prompting you whether or not to reset the performance counter to zero.
5. Select **Reset**.
   The Overruns are reset.

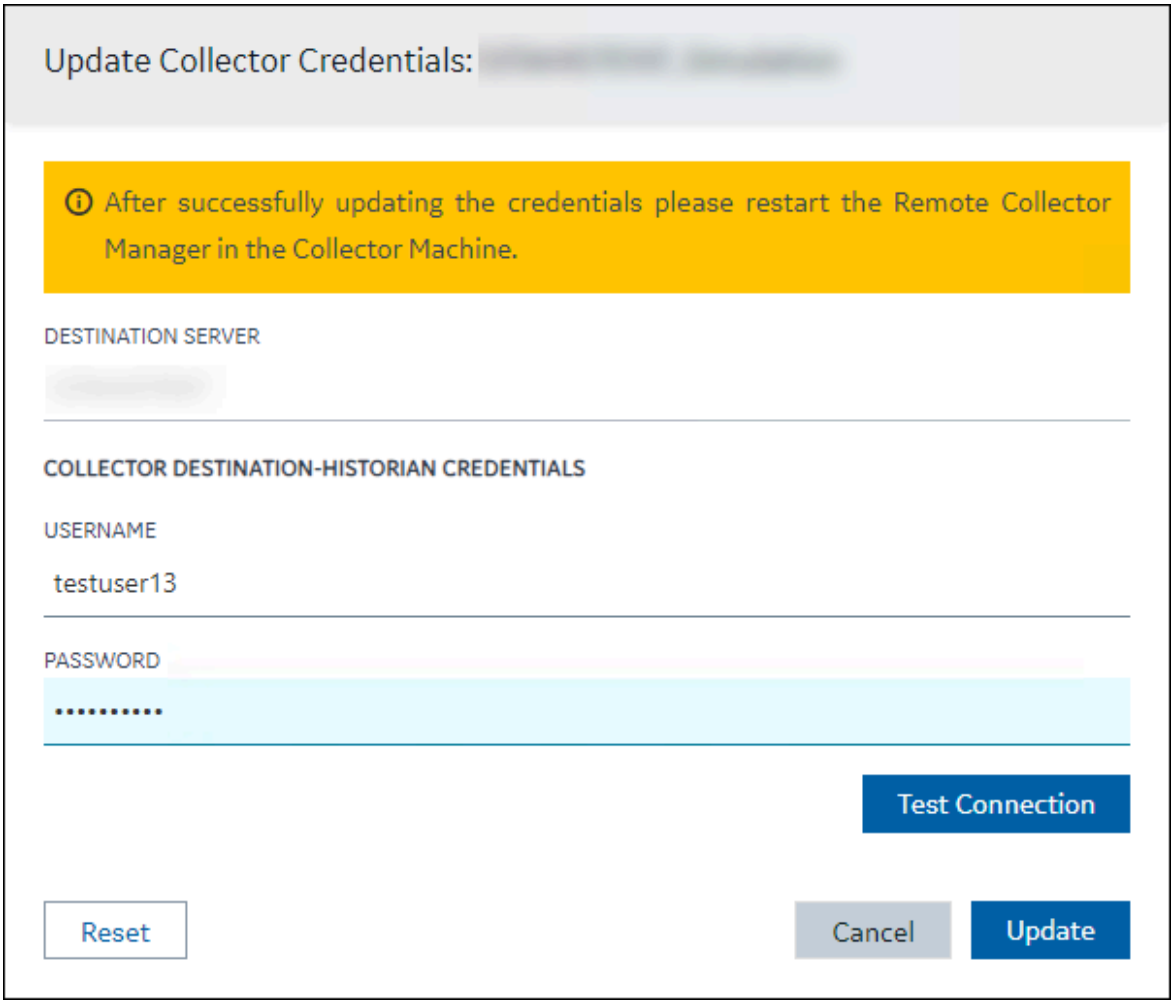
Update Collector Credentials

Whenever there are some changes in the credentials of the destination Historian server, you can update the credentials for the collectors using that server. This topic describes how to update the collector credentials.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears, displaying the details.
3. Select the row containing the collector whose details you want to access.
4. Right-click the collector (or select ⋯), and then select **Update Collector Credentials**.



The **Update Collector Credentials: <Collector name>** window appears.



5. Update the **USERNAME** and **PASSWORD**, and select **Test Connection**.
   Testing connection will help you to validate if the destination server credentials that you entered are valid or not.
6. Select **Update**.
   The updated credentials are saved.
7. Restart the Remote Collector Manager in the collector machine.

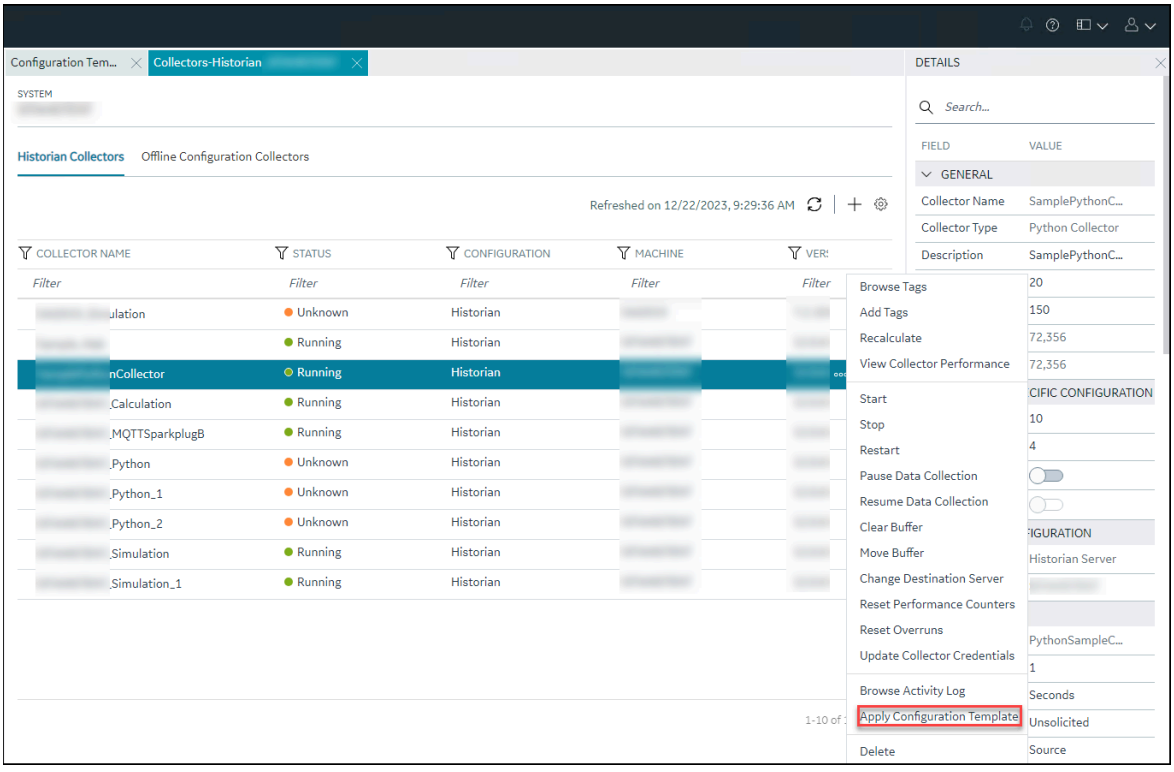
Apply Configuration Template to a Collector

You can apply the created template to collectors as needed. You will be prompted to confirm whether you want to overwrite few of the configuration values with the values in the template.

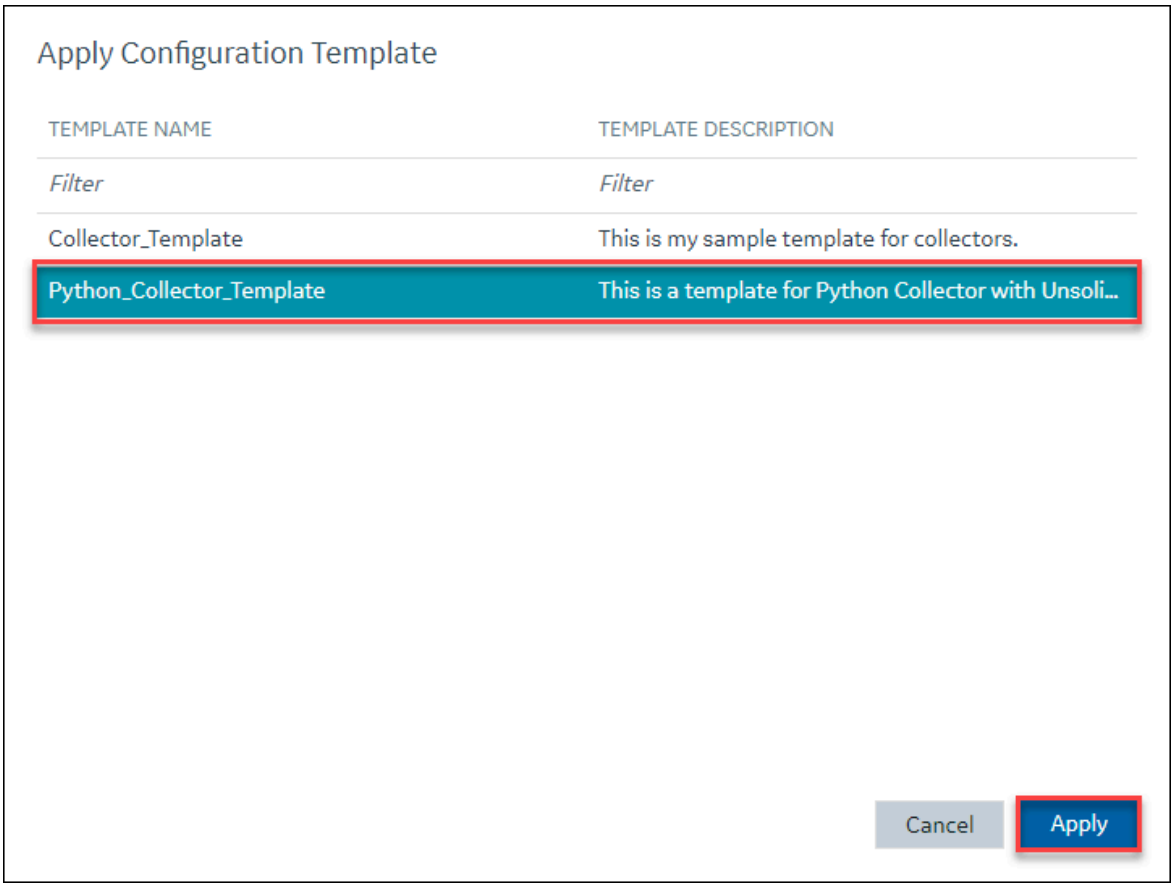
- Ensure that you have a collector instance added *(on page 1076)*.
- Ensure that you created a configuration template for collectors *(on page 1476)*.

This topic describes how to apply a configuration template to a collector.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.
3. Right-click the collector (or select), and then select **Apply Configuration Template**.



The **Apply Configuration Template** window appears, listing the available templates.



4. Select **Apply**.
   A confirmation window appears, prompting you to confirm whether you want to overwrite few of the configuration values with the values in the template.
5. Select **Ok**.
6. In the upper-left corner, select **Save**.
   The configurations in the template are applied to the collector.

Configure Collector Redundancy

1. Create the collector instances *(on page 1076)* that you want to use for collector redundancy. All these collectors must be of the same type.

> **Note:**
> Collector redundancy is not available and supported for the following collectors:
> - File Collector.
> - Calculation Collector.

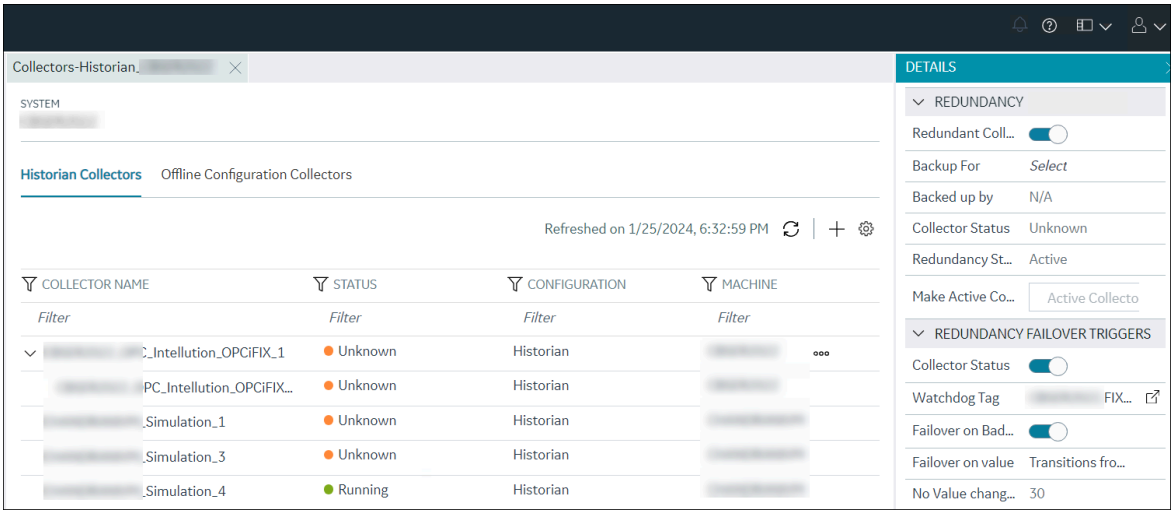
- Python Collector.
- Server-to-Server Collector.
- Server-to-Server Distributor.
- OSI PI Collector.
- OSI PI Distributor.

2. Create tags *(on page)* in the primary collector.
3. If you want to use the values of a watchdog tag as a failover trigger, create the watchdog tag *(on page)* in the primary collector.

Collector redundancy ensures that collection of your data remains uninterrupted. It uses two or more collectors that gather data from a single source. For more information, refer to About Collector Redundancy *(on page)*.

This topic describes how to set up redundancy between two collectors - one primary and the other secondary. You can, however, set up multiple secondary collectors.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.



3. For the primary collector, in the **DETAILS** section, under **REDUNDANCY**, switch the **Redundant Collector** toggle. And then, in the upper-left corner of the page, select **Save**.
   Redundancy is enabled for the primary collector.
4. Repeat the previous step for the secondary collector.
   Redundancy is enabled for the secondary collector.

5. For the secondary collector, in the **DETAILS** section, under **REDUNDANCY**, in the **Backup For** field, select the primary collector, and then select **Save**.
   The secondary collector is configured as a backup for the primary collector.

   > **Note:**
   > If you want to add another collector in the redundancy group, in the **Backup For** field, select the secondary collector.

6. If you want to manually trigger a failover, perform the following steps. Or, if you want to configure automatic triggers, skip to the next step.
   a. Select the collector that you want to make active.
   b. In the **DETAILS** section, under **REDUNDANCY**, in the **Make Active Collector** field, select **Active Collector**.
7. For the secondary collector, in the **DETAILS** section, under **REDUNDANCY FAILOVER TRIGGERS**, enter values as described in the following table, and then select **Save**.

Field	Description
Collector Status	Switch the toggle if you want to trigger failover when the primary collector stops collecting data.
Watchdog Tag	Select , and then select the tag whose values you want to use as a trigger. **Note:** The watchdog tag must be in the primary collector.
Failover on Bad Quality	Switch the toggle if you want to trigger failover when bad data is collected for the watchdog tag.
Failover on value	Specify whether you want to trigger a failover if the value of the watchdog tag is non-zero. You can use this option only if you have not used the **No Value change interval** field.
No Value change interval	Enter the duration in seconds after which you want to trigger a failover if the values of the watchdog tag do not change for the

Field	Description
	specified duration. You can use this option only if you have not used the **Failover on value** field.

The failover triggers are configured. As soon as any of these conditions are satisfied, the secondary collector becomes active and collects data.

Delete a Collector Instance

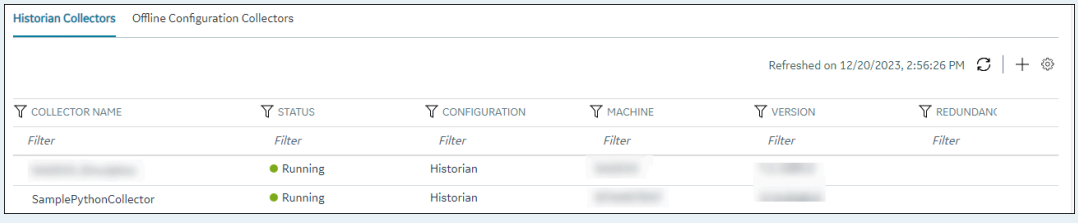
If you no longer want to use a collector instance to collect data, you can delete it. When you delete a collector instance, the Windows service for the collector, the Registry folder, and the buffer files are deleted as well.

This topic describes how to delete a collector instance using Configuration Hub. You can also delete a collector instance using the RemoteCollectorConfigurator utility *(on page)*, which does not require you to install Web-based Clients.

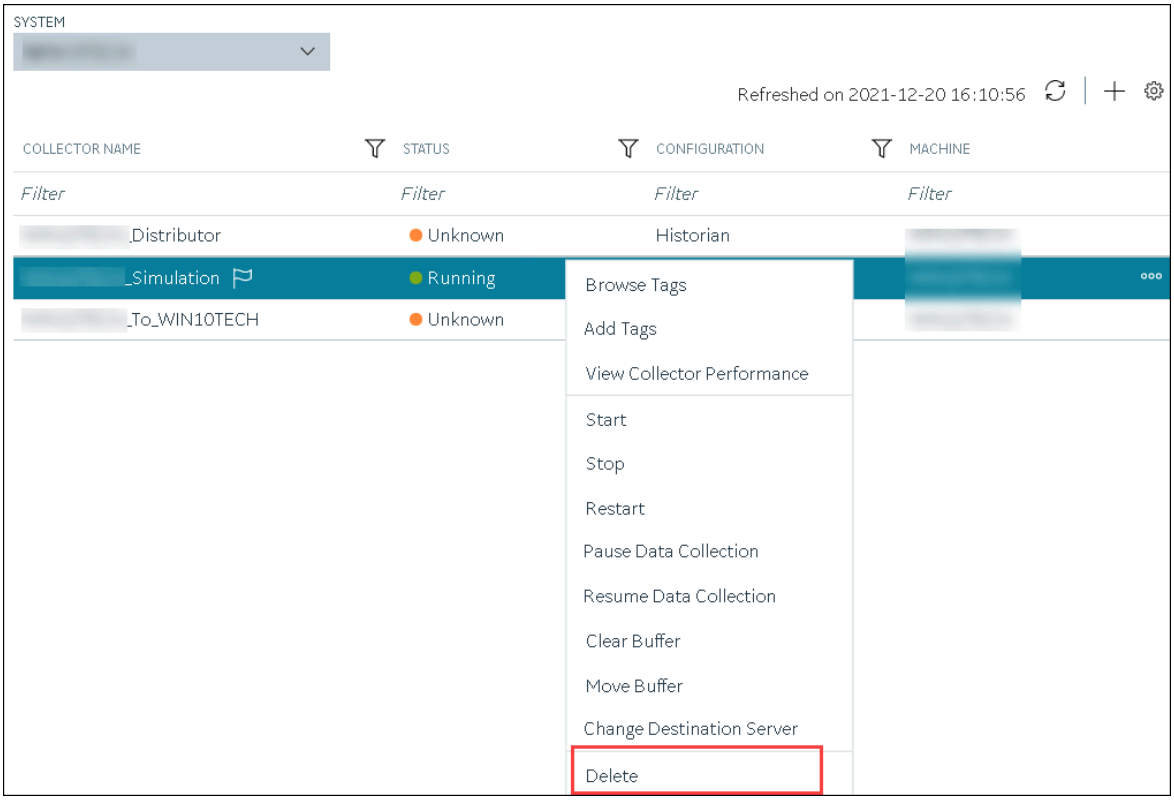
Note:
When you delete an offline collector instance, the corresponding configuration file is not deleted. However, if another collector instance of the same interface name is created, the existing configuration file is replaced by a template configuration file.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors appears.

Tip:
You can filter the collectors by the system name.



3. Right-click the collector instance that you want to delete (or select), and then select **Delete**.



A message appears, asking you to confirm that you want to delete the collector instance.

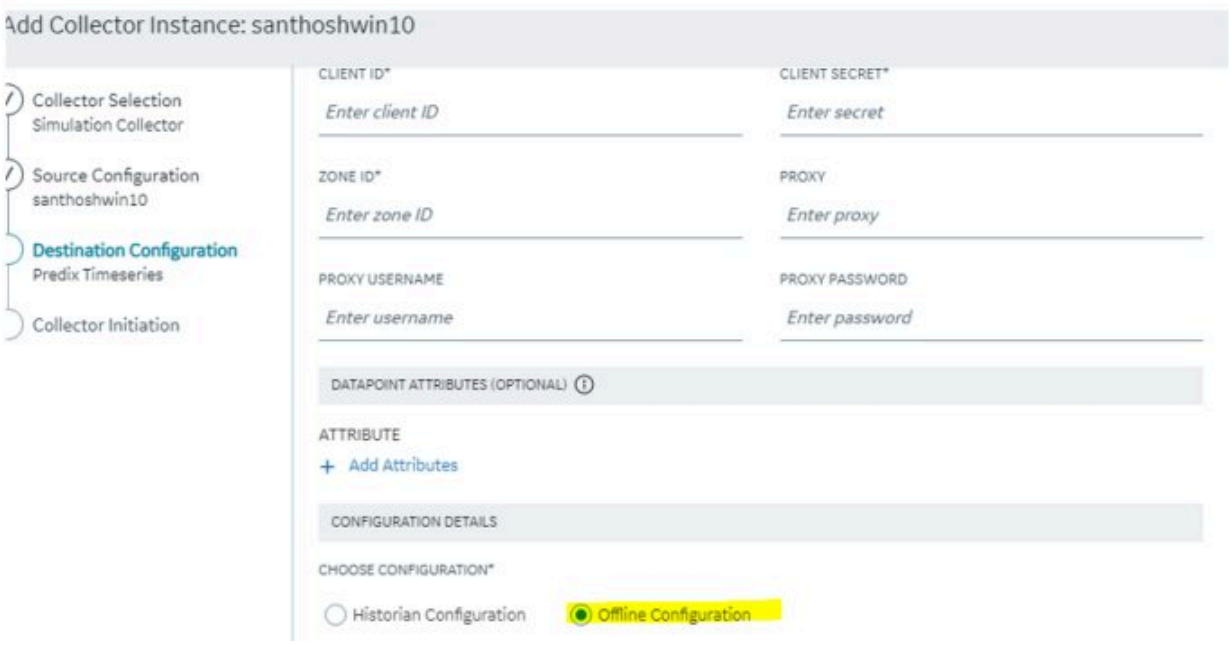
4. If you want to delete the tags as well, select the **Delete associated tags** check box.
5. Select **Delete**.

   The collector instance is deleted.

Managing Offline Configuration Collector Instances

Access Offline Configuration Collectors

Offline Configuration Collectors are the instances of collectors whose destination is the cloud and display the configuration details as Offline Configuration.



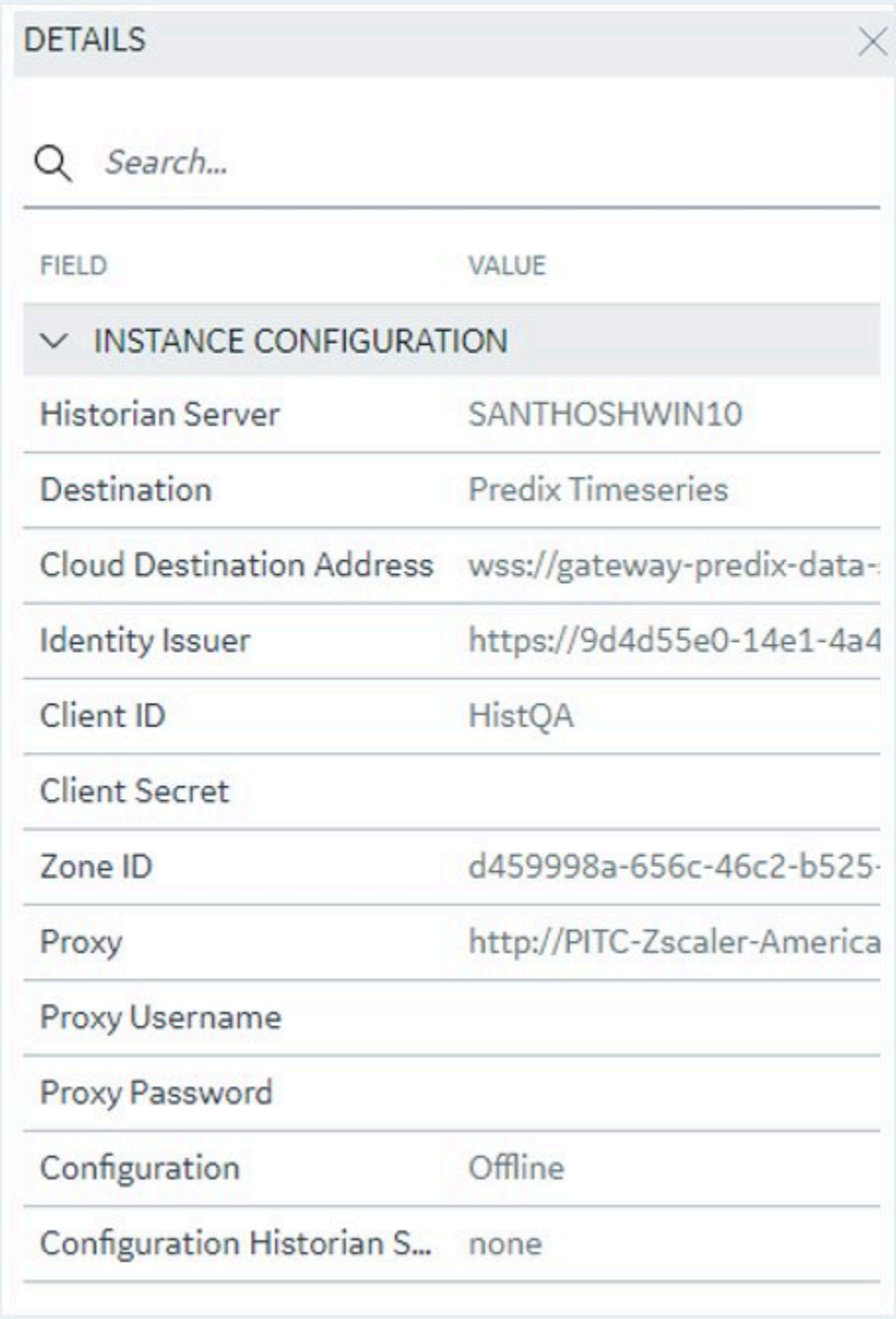
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, expand **Systems**, and then select the system whose collectors you want to access.
   The system appears in the main section.
3. Right-click the system whose collectors you want to access (or select ⋯), and then select **Browse Collectors**.
   This displays the list of Historian collectors and Offline configuration collectors. By default, the Historian collector instances added to the system appear, displaying the following information.

Tip:

- To access the details of a collector, select the row containing the collector instance. The details appear in the **DETAILS** section.
- You can show/hide/reorder columns in the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

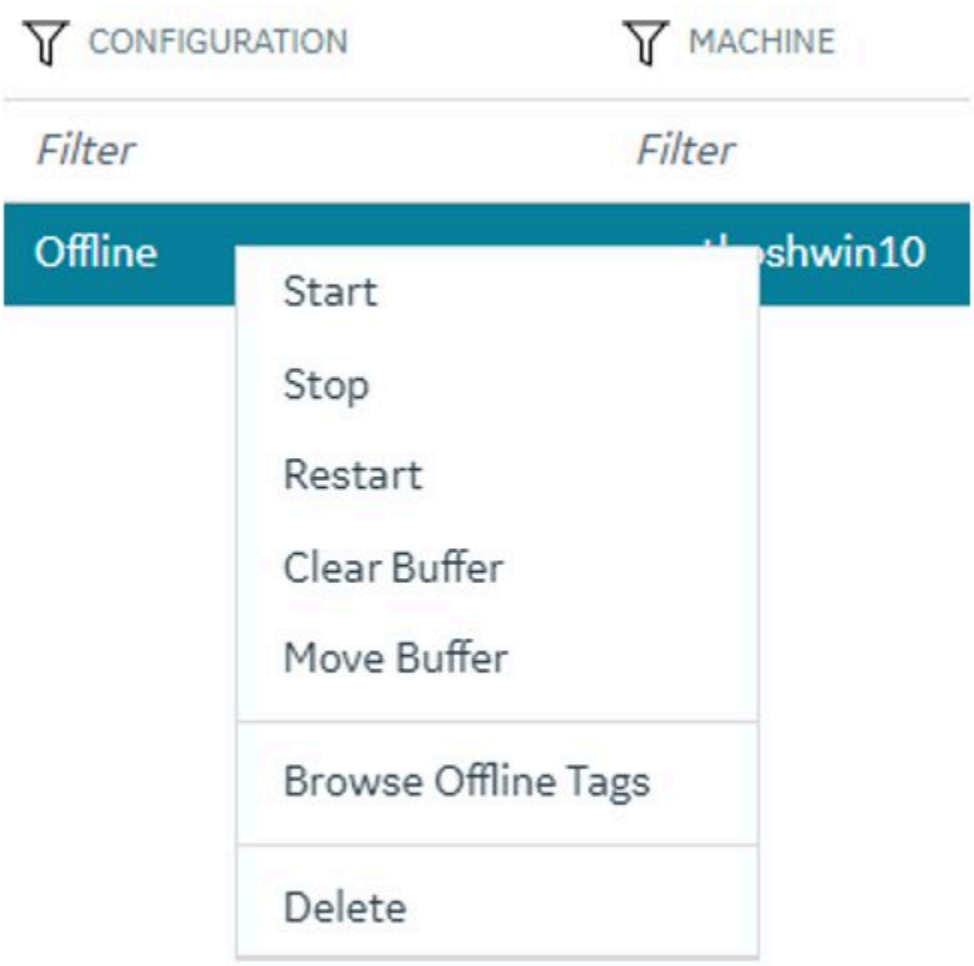
The Details panel for the Offline Configuration Collector Interface contains information regarding the instance configuration provided for the destination while installing software

like Predix, MQTT, or Azure. For example, here is an example of the Details panel for the Offline Configuration Collector:



Manage Offline Configuration Collectors

Like other Historian collectors, Offline Configuration collectors can also be managed by selecting different options:



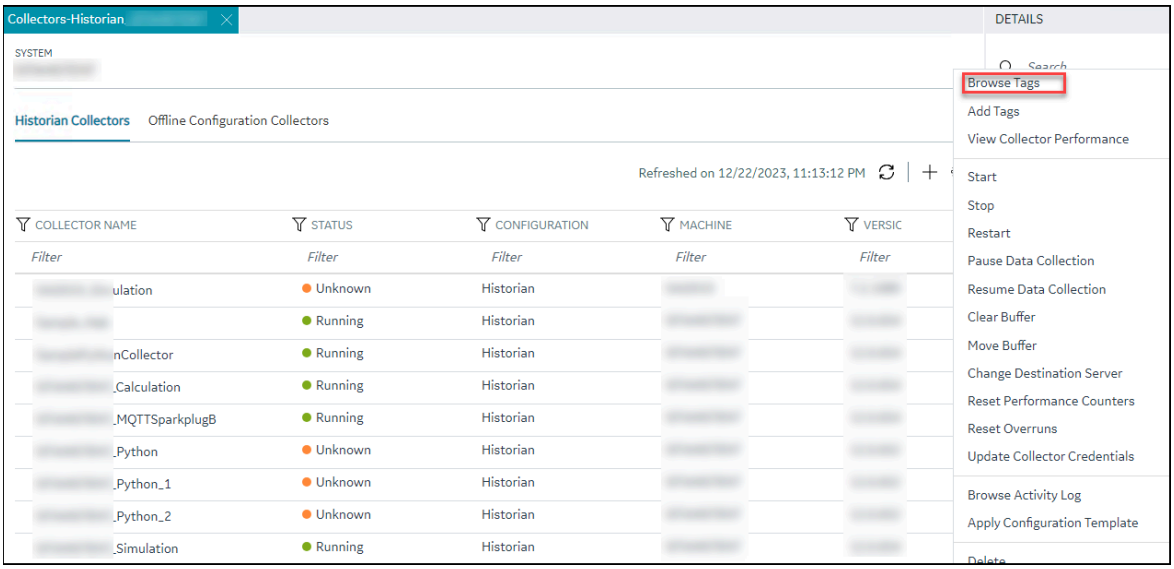
Refer to the following sections on how to use these options:

- Start a Collector *(on page 1356)*
- Stop a Collector *(on page 1357)*
- Restart a Collector *(on page 1358)*
- Delete the Buffer Files of a Collector *(on page 1362)*
- Move the Buffer Files of the Collector *(on page 1363)*
- Delete a Collector Instance *(on page 1373)*

Access the Tags in the Offline Configuration Collector Instance

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**. A list of collectors appears.

3. Right-click the Offline Configuration collectors you want to access (or select ⋯), and then select **Browse Tags**.



A list of tags for which the Offline Configuration collector instance collects data appears.

4. To narrow down your search results, select **Search**, enter the search criteria, and then enter **Search**.
   You can add more search criteria by selecting **Add Attribute**.
   You can enter a name or a value partially or use the wildcard character asterisk (*).
   The list of tags are filtered based on the search criteria.

Managing Tags

About Tags

A Historian tag is used to store data related to a property.

For example, if you want to store the pressure, temperature, and other operating conditions of a boiler, a tag will be created for each one in Historian.

When you collect data using a collector, tags are created automatically in Historian to store these values. These tags are mapped with the corresponding properties in the source.

For example, suppose you want to store OSI PI data in Historian. You will specify the OSI PI tags for which you want to collect data. The OSI PI collector creates the corresponding tags in Historian, and it stores the values in those tags.

You can also choose to create tags manually (for example, to store the result of a calculation performed by the Calculation collector).

About Array Tags

You can store a set of values with a single timestamp and single quality and then read the elements individually or as an array.

The following conditions apply when using an array tag:

- You need not specify the size of an array tag. Data Archiver will store the number of elements that were written.
- You can change a tag to an array tag later as well. However, when you do so, only the latest data is retrieved. If you want to get the old data, you must change the tag back to its previous type.
- The maximum number of elements that an array tag can store is 10,000.
- You cannot associate an enumerated set or a user-defined data type (UDT) with an array tag.
- Fixed String and Scaled data types are not supported.
- Scaling, collector compression, and archive compression do not apply to an array tag.
- You cannot use an array element as a calculation trigger.
- You cannot plot a trend chart for an array tag.
- TagStats calculation mode is not supported.

About Collector and Archive Compression

Collector Compression

Collector compression applies a smoothing filter to data retrieved from the data source. By ignoring small changes in values that fall within a deadband centered around the last reported value, only significant changes are reported to the archiver. Fewer samples reported yields less work for the archiver and less archive storage space used.

You can specify the deadband value. For convenience, if you enter a deadband percentage, Historian Administrator shows the deadband in engineering units. For example, if you specify a 20% deadband on 0 to 500 EGU span, it is calculated and shown as 100 engineering units. If you later change the limits to 100 and 200, the 20% deadband is now calculated as 20 engineering units.

The deadband is centered around the last reported sample, not simply added to it or subtracted. If your intent is to have a deadband of 1 unit between reported samples, you must enter a compression deadband of 2 so that it is one to each side of the last reported sample. In the previous example of 0 to 500 EGU range, with a deadband of 20%, the deadband is 100 units; This means that only if the value changes by more than 50 units, it is reported.

Changes in data quality from good to bad, or bad to good, automatically exceed collector compression and are reported to the archiver. Any data that comes to the collector out of time order will also automatically exceed collector compression.

It is possible for collected tags with no compression to appear in Historian as if the collector or archive compression options are enabled. If collector compression occurs, you will notice an increase in the percentage of the compression value in the **Collectors** section of the **System Statistics** page in Historian Administrator. When archive compression occurs, you will notice the archive compression value and status bar change on the **System Statistics** page.

For instructions on setting collector compression, refer to Access/Modify a Tag *(on page)*.

Even if collector compression is not enabled, you may notice it in the following scenarios:

- When a succession of bad data quality samples appears, Historian collects only the first sample in the series. No new samples are collected until the data quality changes. Historian does not collect the redundant bad data quality samples, and this is reflected in the collector compression percentage.
- For a Calculation or Server-to-Server collector, when calculations fail, producing no results or bad quality data, collector compression is used. The effect of Collector Compression Timeout is to behave, for one poll cycle, as if the collector compression feature is not being used. The sample collected from the data source is sent to the archiver. Then the compression is turned back on, as configured, for the next poll cycle with new samples being compared to the value sent to the archiver.

Note:
Array tags do not support archive and collector compression. If the tag is an array tag, then the **Compression** tab is disabled.

Handling Value Step Changes with Collector Data Compression

If you enable collector compression, the collector does not send values to the archiver any new input values if the value remains within its compression deadband. Occasionally, after several sample intervals inside the deadband, an input makes a rapid step change in value during a single sample interval. Since there have been no new data points recorded for several intervals, an additional sample is stored one interval before the step change with the last reported value to prevent this step change from being viewed as a slow ramp in value. This value marks the end of the steady-state, non-changing value period, and provides a data point from which to begin the step change in value.

Note:
You can configure individual tags can be configured to retrieve step value changes.

The collector uses an algorithm that views the size of the step change and the number of intervals since the last reported value to determine if a marker value is needed. The following is an example of the algorithm:

```
BigDiff=abs(HI_EGU-LO_EGU)*(CompressionDeadbandPercent/(100.0*2.0))*4.0

If ( Collector Compression is Enabled )

If ( Elapsed time since LastReportedValue>=( SampleInterval * 5 ) )

If ( abs(CurrentValue-LastReportedValue) > BigDiff )

Write LastReportedValue,Timestamp=(CurrentTime-SampleInterval)
```

In the example above, if a new value was not reported for at least the last 4 sample intervals, and the new input value is at least 4 deltas away from the old value (where a single delta is equal to half of the compression deadband), then a marker value is written.

Note:
These settings are also adjustable from the Registry. Please contact technical support for more information.

Value Spike with Collector Compression

For example, a collector reads a value X once per second, with a compression deadband of 1.0. If the value of X is 10.0 for a number of seconds starting at 0:00:00 and jumps to 20.0 at 0:00:10, the data samples read would be:

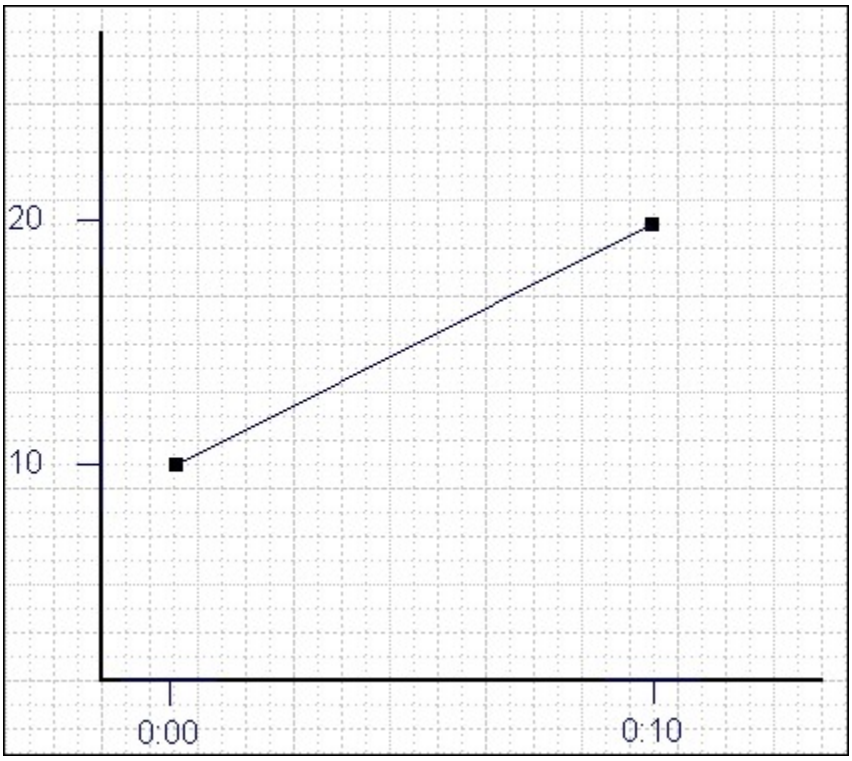
Time	X Value
0:00:00	10.0 (steady state value)
0:00:01	10.0
0:00:02	10.0
0:00:03	10.0
0:00:04	10.0
0:00:05	10.0
0:00:06	10.0

Time	X Value
0:00:07	10.0
0:00:08	10.0
0:00:09	10.0
0:00:10	20.0 (new value after step change)

To increase efficiency, the straightforward compression would store only 2 of these 11 samples.

Time	X Value
0:00:00	10.0 (steady state value)
0:00:10	20.0 (new value after step change)

However, without the marker value, if this data were to be put into a chart, it would look like the data value **ramped** over 10 seconds from a value of 10.0 to 20.0, as shown in the following chart.



The addition of a **marker value** to the data being stored results in the following data values:

Time	X Value
0:00:00	10.0 (steady state value)
0:00:09	10.0 (inserted Marker value)
0:00:10	20.0 (new value after step change)

If you chart this data, the resulting trend accurately reflects the raw data and likely real world values during the time period as shown in the following chart.

Evaluating and Controlling Data Compression

You can achieve optimum performance in Historian by carefully controlling the volume of dynamic data it collects and archives. You need enough information to tell you how the process is running, but you do not need to collect and store redundant or non-varying data values that provide no useful information.

Control Data Flow

You can control the amount of online or dynamic data the system handles at a given time by adjusting certain system parameters. The general principle is to control the flow of data into the archive either by adjusting the rate at which the collectors gather data or by adjusting the degree of filtering (compression) the system applies to the data collected.

Adjust the following parameters to *reduce* the rate of data flow into the server.

- Reduce the polling rate by increasing the collection interval for unsolicited and polled collection.
- Enable collector compression and optionally use compression timeout.
- Set the compression deadband on the collectors to a wider value.
- Use the collector compression timeout.

Adjust the following parameters to *increase the filtering* applied by the archiver in the server.

- Enable archive (trend) compression.
- Set the archive compression deadband to a wider value.
- Where possible, use the scaled data type and enable input scaling on selected tags.
- Where possible, select milliseconds or microseconds rather than seconds for time resolution. Seconds is optimum for most common devices. This affects disk space.

Evaluate Data Compression Performance

You can determine how effectively data compression is functioning at any given time by examining the system statistics displayed on the **System Statistics** page of Historian Administrator.

The compression field at the top of the page shows the current effect of archive compression. Values for this parameter should typically range from 0 to 9%. If the value is zero, it indicates that compression is either ineffective or turned off. If it shows a value other than zero, it indicates that archive compression is operating and effective. The value itself indicates how well it is functioning. To increase the effect of data compression, increase the value of archive compression deadband so that compression becomes more active.

Archive Compression

Archive compression is used to reduce the number of samples stored when data values for a tag form a straight line in any direction. For a horizontal line (non-changing value), the behavior is similar to collector compression. But, in archive compression, it is not the *values* that are being compared to a deadband, but the *slope of line* those values produce when plotted value against time. Archive compression logic is executed in the data archiver and, therefore, can be applied to tags populated by methods other than collectors.

You can use archive compression on tags where data is being added to a tag by migration, or by the File collector, or by an SDK program for instance. Each time the archiver receives a new value for a tag, the archiver computes a line between this incoming data point and the last archived value.

The deadband is calculated as a tolerance centered about the slope of this line. The slope is tested to see if it falls within the deadband tolerance calculated for the previous point. If the new point does not exceed the tolerance, it is not stored in the archive. This process repeats with subsequent points. When an incoming value exceeds the tolerance, the value held by the archiver is written to disk and the incoming sample is withheld.

The effect of the archive compression timeout is that the incoming sample is automatically considered to have exceeded compression. The withheld sample is archived to disk and the incoming sample becomes the new withheld sample. If the Archive Compression value on the System Statistics page indicates that archive compression is occurring, and you did not enable archive compression for the tags, the reason could be because of internal statistics tags with archive compression enabled.

For instructions on setting archive compression, refer to Access/Modify a Tag *(on page)*.

About Scaling

Scaling converts a data value from a raw value expressed in an arbitrary range of units, such as a number of counts, to one in engineering units, such as gallons per minute or pounds per square inch. The scaled data type can serve as a third form of data compression, in addition to collector compression and archive compression, if it converts a data value from a data type that uses a large number of bytes to one that uses fewer bytes.

About Condition-Based Collection

Condition based collection is a method to control the storage of data for data tags by assigning a condition. Data is always collected but it is only written to the Data Archiver if the condition is true; otherwise, the collected data is discarded.

This condition is driven by a trigger tag; a tag collected by the collector evaluating the condition. Ideally, Condition based Collection should be used only with tags that are updating faster than the trigger tag. Condition based collection can be used to archive only the specific data which is required for analysis, rather than archiving data at all times, as the collector is running.

For example, if a collector has tags for multiple pieces of equipment, you can stop collection of tags for one piece of equipment during its maintenance. It is typically used on tags that use fast polled collection but you don't want to use collector compression. While the equipment is running, you want all the data but when the equipment is stopped, you don't want any data stored. The trigger tag would also typically use polled collection. But, either tag could use unsolicited collection.

The condition is evaluated every time data is collected for the data tag. When a data sample is collected, the condition is evaluated and data is either queued for sending to archiver, or discarded. If the condition

cannot be evaluated as true or false, like if the trigger tag contains a bad data quality or the collector is not collecting the trigger tag, the condition is considered true and the data is queued for sending.

No specific processing occurs when the condition becomes true or false. If the condition becomes true, no sample is stored to the data tag using that condition, but the data tag will store a sample next time it collects. When the condition becomes false, no end of the collection marker is stored until the data tag is collected.

For example, if the condition becomes false at 1:15 and the data tag gets collected at 1:20, the end of collection marker will be created at 1:20 and have a timestamp of 1:20, not 1:15.

Condition based collection is supported by only archiver and collectors of Historian version 4.5 and above. Condition based collection does not apply to alarm collectors. This condition based collection is applicable to the following collectors only:

- Simulation Collector
- OPC Collector
- iFIX Collector
- PI Collector

For instructions on setting the condition-based collection, refer to Access/Modify a Tag *(on page)*.

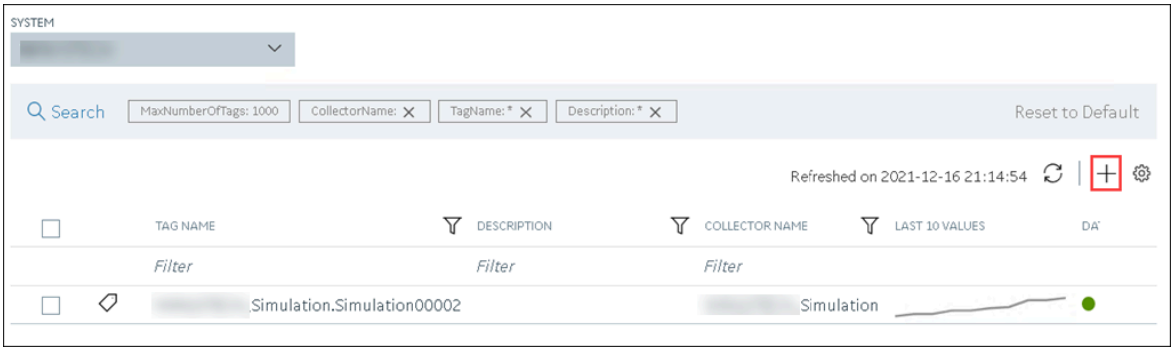
Add Tags for the Data Store Using Configuration Hub

- Add the collector instance *(on page 1076)* using which you want to collect data. Ensure that the collector is running.
- By default, the tag data is stored in the user data store, which is created automatically when you set up Configuration Hub. If, however, you want to store the data in a different data store, create it *(on page 1089)*.

This topic describes how to specify the tags for which you want to collect data by browsing through the tags in the data source. For example, for an iFIX collector, if there are 1,00,000 tags in the iFIX server, you must specify the ones for which you want to collect data. Only then data is collected for those tags.

In addition to adding tags from the data source, you can create tags manually *(on page 1192)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select +.

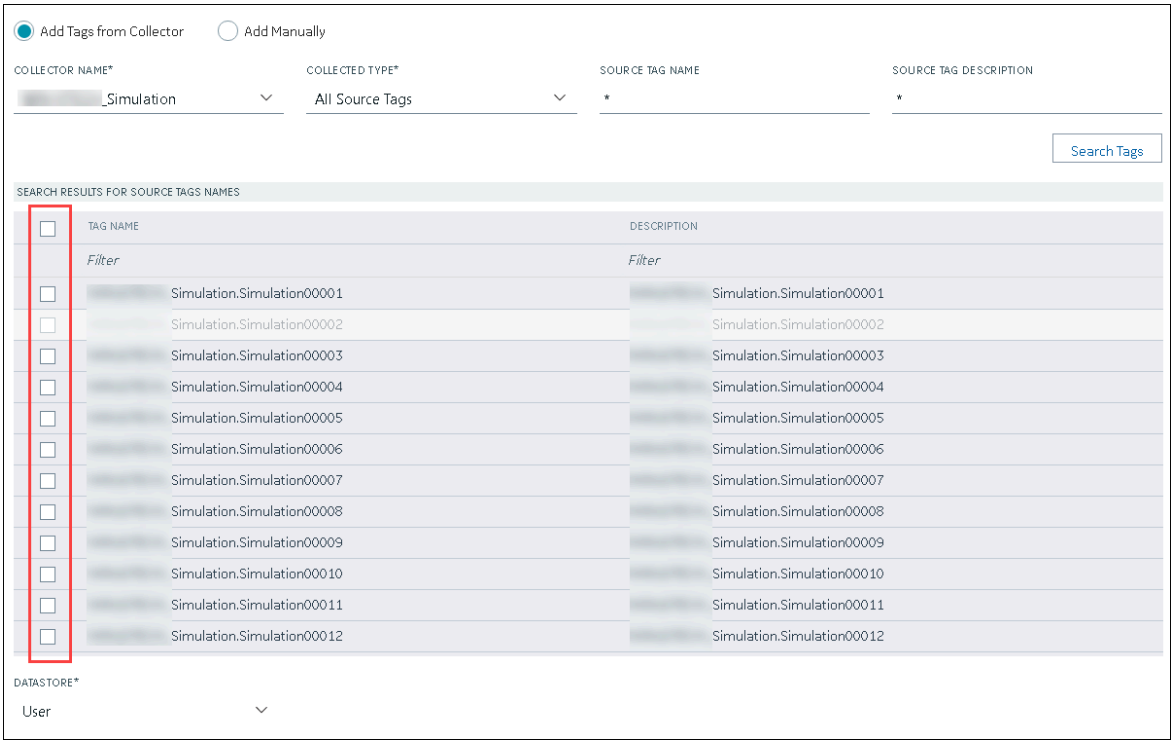


The **Add Tag-<system name>** page appears. The **Add Tags from Collector** option is selected by default.

4. Enter values as described in the following table.

Field	Description
COLLECTOR NAME	Select the collector instance that you want to use to collect data. A value is required.
COLLECTED TYPE	Specify whether you want to browse through all the tags in the data source or only from the tags that you have not added yet. A value is required.
SOURCE TAG NAME	Enter the name of the tag (either completely or partially) to narrow down the search results.
SOURCE TAG DESCRIPTION	Enter the description of the tag (either completely or partially) to narrow down the search results.

5. Select **Search Tags**.
   A list of tags that match *all* the criteria that you have specified appears. If a tag is already added, it is disabled.
6. Select the check box corresponding to each tag for which you want to collect data.



7. In the **DATA STORE** field, if you want to store the data in a different data store than the user data store, select the same.
8. Select **Add Tag**.
   Data collection begins for the selected tags.

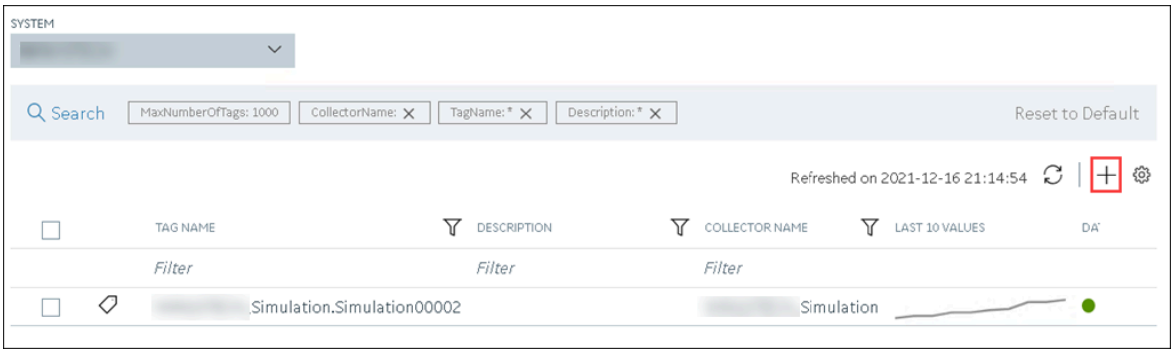
As needed, configure each tag by providing values for the tag properties. For information on the delta query modes, refer to Counter Delta Queries.

Add a Tag Manually

- Add the collector instance *(on page 1076)* using which you want to collect data.
- By default, the tag data is stored in the user data store, which is created automatically when you set up Configuration Hub. If, however, you want to store the data in a different data store, create it *(on page 1089)*.

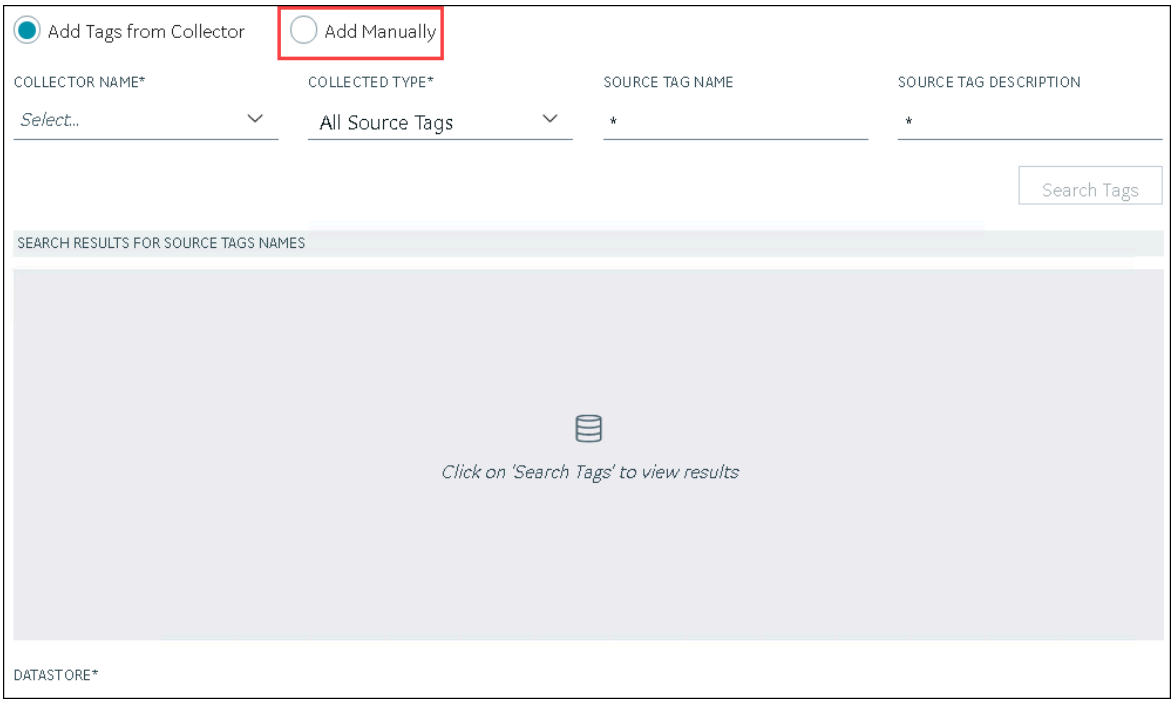
After you create a collector instance, you specify which tags from the source must be used for data collection *(on page 1077)*. In addition, if you want to use the same tag twice (say, with a different collection interval or collector compression settings), you can add the tag manually. You can also create a calculation tag or a tag to store the values imported using the Excel Add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select +.



The **Add Tag-<system name>** page appears. The **Add Tags from Collector** option is selected by default.

4. Select **Add Manually**.



5. Enter values as described in the following table.

Field	Description
COLLECTOR NAME	Select the collector instance that you want to use to collect data. If, however, this tag is not associated with a collector, you

Field	Description
	can leave the field blank (for example, you want to ingest this data manually instead of using a collector).
SOURCE ADDRESS	Specify the source tag to which you want to map the one you are creating. This field is enabled only if you select a value in the **COLLECTOR NAME** field. When you select ▫▫▫, the **Browse Source Tag: <collector name>** window appears. Provide the search criteria to find the tag that you want to map.
TAG NAME	Enter a name for the tag. A value is required and must be unique for the Historian server. The value that you enter: ◦ Must begin with a letter or a number. ◦ Can contain up to 256 characters. ◦ Can include any of the following special characters: /!| #{}%$-_ ◦ Must not include a space or any of the following characters: ~`+^:;.,?"*=@
DATA TYPE	Select the data type of the tag data. To find out the data types supported by a collector, refer to the documentation on the collector that you have created. **Important:** If you select an unsupported data type, you may receive incorrect data or even lose data. If you select **Multi-Field**, the **USER-DEFINED TYPE NAME** field appears, and the **ENUMERATED SET** and **ARRAY TAG** fields are disabled. If you select **Fixed String**, the **STRING LENGTH** field appears.
STRING LENGTH	Enter the maximum character length allowed for the tag data. This field appears only if the value in the **DATA TYPE** field is **Fixed String**. A value is required. You can enter a value between 1 and 255. The default value is 8.

Field	Description
USER-DEFINED TYPE NAME	Select the user-defined data type (UDT) *(on page 1438)* that you want to assign to the tag. This field appears only if the value in the **DATA TYPE** field is **Multi-Field**. A value is required.
ENUMERATED SET	Select the enumerated set *(on page 1426)* that you want to assign to the tag. This field is not applicable for string and multi-field data types (enumerated sets) and for array tags.
ARRAY TAG	Switch the toggle to indicate whether the tag stores an array of data. This field is disabled if you select a value in the **ENUMERATED SET** field or if the value in the **DATA TYPE** field is **Multi-Field**. For information on array tags, refer to About Array Tags *(on page 1379)*.
TIME RESOLUTION	Select the time resolution for the tag. A value is required. For example, if you select **Seconds**, when you plot the data on a trend chart, the timestamp of the data points will be one second apart.
DATA STORE	If you want to store the data in a different data store that the user data store, select the same.

6. Select **Add Tag**.
   Data collection begins for the selected tags.

As needed, configure each tag by providing values for the tag properties. For information on the delta query modes, refer to Counter Delta Queries.

Access a Tag

To search for a tag, you can choose from the following options:

- Access all the tags in all the systems available in the Historian server.
- Access the tags added to a specific collector instance.
- Access the tags added to all the collector instances in a specific Historian system.

You can narrow down the search results further by performing a search.

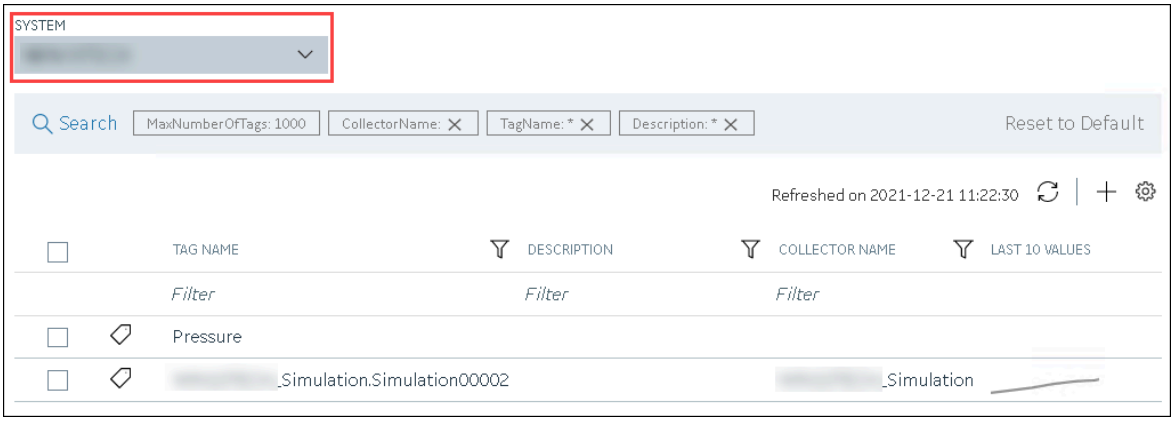
Note:
By default, maximum one million tags are retrieved. If the Historian clients are configured to retrieve more than a million tags, to retrieve all of them, add the `MaxTagsToRetrieve` registry key under `HKEY_LOCAL_MACHINE\SOFTWARE\Intellution, Inc.\iHistorian\Services\DataArchiver\`, and then set the maximum number of tags that you want to retrieve. Restart the Historian Data Archiver service for the change to reflect.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears, displaying the following information.

Column	Description
TAG NAME	The name of the tag.
DESCRIPTION	The description of the tag.
COLLECTOR NAME	The name of the collector instance to which you have added the tag.
LAST 10 VALUES	The last 10 values collected for the tag, plotted as a trend chart. If you pause over the chart, the minimum, maximum, first, and last values among the 10 values appear.
TAG ALIAS	Indicates whether the tag contains aliases, which are created when you rename the tag using an alias *(on page 1417)*.

Tip:
You can show/hide/reorder columns in the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

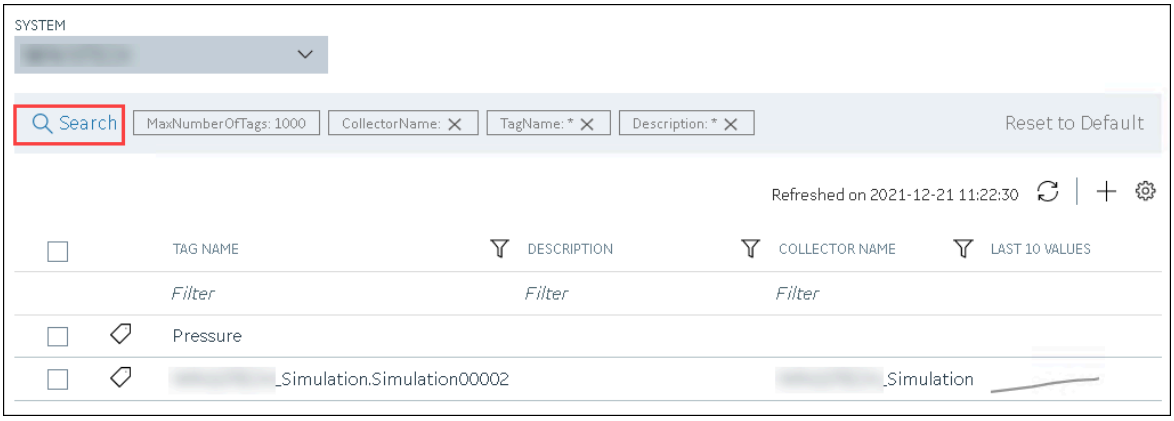
3. If you want to access the tags specific to a Historian system, in the drop-down list box in the upper-left corner of the main section, select the system.



Alternatively, you can access the system from the **NAVIGATION** section, right-click the system (or select), and then select **Browse Tags**.

The list of tags is filtered to display only the tags specific to the system.

4. If you want to narrow down the search results, select **Search**.



Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*).

The tags are filtered based on the search criteria.

5. Select the row containing the tag that you want to access.

The tag details appear in the **DETAILS** section.

Table 39. The General Section

Field	Description
Tag Name	The name of the tag. This field is disabled and populated.
Description	The description of the tag.
Comment	Comments that apply to the tag.

Field	Description
StepValue	Indicates that the actual measured value changes in a sharp step instead of a smooth linear interpolation. This option is applicable only for numeric data. Enabling this option only affects data retrieval; it has no effect on data collection or storage.
Last Modified Time	The date the last tag parameter modification was made. This field is disabled and populated.
Last Modified User	The name of the person who last modified the tag configuration parameters. This field is disabled and populated.

Table 40. The Collection Section

Field	Description
Collector	The name of the collector that collects data for the selected tag.
Source Address	The address for the tag in the data source. Leave this field blank for tags associated with the Calculation or Server-to-Server collector. For Python Expression tags, this field contains the full applicable JSON configuration, which includes an indication of the source address. **Note:** When exporting or importing tags using the Excel Add-in for Historian, the Calculation column, not the SourceAddress column, holds the formulas for tags associated with the Calculation or Server-to-Server collector.
Data Type	The data type of the tag. The main use of the scaled data type is to save space, but this results in a loss of precision. Instead of using 4 bytes of data, it only uses 2 bytes by storing the data as a percentage of the EGU limit. Changing the EGU limits will result in a change in the values that are displayed. For example, if the original EGU values were 0 to 100 and a value of 20 was stored using the scaled data type and if the EGUs are changed to 0 to 200, the original value of 20 will be represented as 40.

Field	Description
	Note: If you change the data type of an existing tag between a numeric and a string or binary data type (and vice versa), the tag's compression and scaling settings will be lost.
Value	The number of bytes for a fixed string data type. This field is enabled only for fixed string data types.
Enumerated Set Name	The name of the enumerated set *(on page 1426)* that you want to assign to the tag.
Array Tag	Indicates that the tag is an array tag *(on page 1379)*.
Location	The distributed location of the system in which the tag data is stored (applicable only for a horizontally scalable system).
Data Store	The data store in which the tag data is stored.
Collection	Indicates whether data collection is enabled or disabled for the tag. If you disable collection for the tag, Historian stops collecting data for the tag, but does not delete the tag or its data.
Collection Type	The type of data collection used for this tag, which can be polled or unsolicited. Polled means that the data collector requests data from the data source at the collection interval specified in the polling schedule. Unsolicited means that the data source sends data to the collector whenever necessary (independent of the data collector polling schedule).
Collection Interval	The time interval between readings of data from this tag. With Unsolicited Collection Type, this field defines the minimum interval at which unsolicited data should be sent by the data source.
Collection Offset	Used with the collection interval to schedule collection of data from a tag. For example, to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), enter a collection interval of 1 hour and an offset of 30 minutes. Similarly, to collect a value each day at 8am, enter a collection interval of 1 day and an offset of 8 hours.

Field	Description
	Note: If you enter a value in milliseconds, the value must be in intervals of 1000 ms. For example, 1000, 2000, and 3000 ms are valid values, but 500 and 1500 ms are invalid. The minimum value is 1000 ms.
Time Resolution	The precision for timestamps, which can be either seconds, milliseconds or microseconds.
Condition-Based	Indicates whether condition-based data collection *(on page 1385)* is enabled.
Trigger Tag	The name of the trigger tag used in the condition.
Comparison	The comparison operator that you want to use in the condition. Select one of the following options: ◦ **Undefined**: Collection will resume only when the value of the triggered tag changes. This is considered an incomplete configuration, so condition-based collection is turned off and all the collected data is sent to archiver. ◦ **< =**: Setting condition as trigger tag value less than or equal to the compare value. ◦ **> =** Setting condition as trigger tag value greater than or equal to the compare value. ◦ **<**: Setting condition as trigger tag value less than the compare value. ◦ **>**: Setting condition as trigger tag value greater than the compare value. ◦ **=**: Setting condition as trigger tag value equals compare value. ◦ **!=**: Setting condition as trigger tag value not the same as compare value.
Compare Value	A target value that you want to compare with the value of the trigger tag. If using = and != comparison parameters, ensure that the format of the compared value and triggered tag are the same. For example, for a float type trigger tag, the compare value must be a float value; otherwise, the condition result is an invalid configuration. When the config-

Field	Description
	uration is invalid, condition-based collection is disabled and all data is sent to archiver.
End of Collection Markers	Indicates whether end-of-collection markers are enabled. This will mark all the tag's values as bad, and sub-quality as ConditionCollectionHalted when the condition becomes false. Trending and reporting applications can use this information to indicate that the real-world value was unknown after this time until the condition becomes true and a new sample is collected. If disabled, a bad data marker is not inserted when the condition becomes false.

Table 41. The Collection Options Section

Field	Description
Data Collection	Indicates whether data collection is enabled or disabled for the tag. If you disable collection for the tag, Historian stops collecting data for the tag, but does not delete the tag or its data.
Collection Type	The type of data collection used for this tag: ◦ **Polled**: The data collector requests data from the data source at the collection interval specified in the polling schedule. ◦ **Unsolicited**: The data source sends data to the collector whenever necessary (independent of the data collector polling schedule).
Collection Interval	The time interval between readings of data from this tag. For unsolicited collection type, this field defines the minimum interval at which unsolicited data should be sent by the data source.
Collection Offset Value and **Collection Offset**	Used with the collection interval to schedule collection of data from a tag. For example, to collect a value for a tag every hour at thirty minutes past the hour (12:30, 1:30, 2:30, and so on), enter a collection interval of 1 hour and an offset of 30 minutes. Similarly, to collect a value each day at 8am, enter a collection interval of 1 day and an offset of 8 hours.  **Note:** If you enter a value in milliseconds, the value must be in intervals of 1000 ms. For example, 1000, 2000, and 3000 ms are

Field	Description
	valid values, but 500 and 1500 ms are invalid. The minimum value is 1000 ms.
Time Resolution	The precision for timestamps, which can be either seconds, milliseconds or microseconds.
Condition based collection	Indicates whether condition-based data collection *(on page 1385)* is enabled.
Trigger Tag	The name of the trigger tag used in the condition.
Comparison	The comparison operator that you want to use in the condition. This field is enabled only if you have enabled condition-based collection. Select one of the following options: ◦ **Undefined**: Collection will resume only when the value of the triggered tag changes. This is considered an incomplete configuration, so condition-based collection is turned off and all the collected data is sent to archiver. ◦ **< =**: Setting condition as trigger tag value less than or equal to the compare value. ◦ **> =** Setting condition as trigger tag value greater than or equal to the compare value. ◦ **<**: Setting condition as trigger tag value less than the compare value. ◦ **>**: Setting condition as trigger tag value greater than the compare value. ◦ **=**: Setting condition as trigger tag value equals compare value. ◦ **!=**: Setting condition as trigger tag value not the same as compare value.
Compare Value	A target value that you want to compare with the value of the trigger tag. If using = and != comparison parameters, ensure that the format of the compared value and triggered tag are the same. For example, for a float type trigger tag, the compare value must be a float value; otherwise, the condition result is an invalid configuration. When the configuration is invalid, condition-based collection is disabled and all data is sent to archiver.

Field	Description
End of Collection Markers	Indicates whether end-of-collection markers are enabled. This will mark all the tag's values as bad, and sub-quality as ConditionCollectionHalted when the condition becomes false. Trending and reporting applications can use this information to indicate that the real-world value was unknown after this time until the condition becomes true and a new sample is collected. If disabled, a bad data marker is not inserted when the condition becomes false.

Table 42. The Scaling Section

Field	Description
EGU Description	The Engineering Units (EGU) provide context to a tag's value by providing an accurate representation of the tag values through their corresponding units. This will help you to know the units of data that you pull. For example, you can enter "Temperature" or "degree Celsius" in **EGU Description** for a single tag or multiple tags associated with temperature values. When you view the last 10 values of the tag *(on page 1409)*, or when you generate a query *(on page 1453)*/write *(on page 1457)* report in the **Data** page, EGU you enter will be displayed under the **Engineering Units** column in the table view and as a tool tip in the trend view.
Hi Engineering Units	The current value of the upper range limit of the span for this tag. Engineering Hi and Lo are retrieved automatically for F_CV fields for iFIX tags; all others are left at default settings. When adding tags from the server using an OPC Collector, the OPC Collector queries the server for the EGU units and EGU Hi/Lo limits. However, not all OPC Servers make this information available. Therefore, if the server does not provide the limits when requested to do so, the collector automatically assigns an EGU range of 0 to 10,000.

Field	Description
Lo Engineering Units	The current value of the lower range limit of the span for this tag.
Input Scaling	Indicates whether input scaling is enabled, which converts an input data point to an engineering units value. For example, to rescale and save a 0 - 4096 input value to a scaled range of 0 - 100, enter 0 and 4096 as the low and high input scale values and 0 and 100 as the low and high engineering units values, respectively. If a data point exceeds the high or low end of the input scaling range, Historian logs a bad data quality point with a ScaledOutOfRange subquality. In the previous example, if your input data is less than 0, or greater than 4096, Historian records a bad data quality for the data point. **OPC Servers and TRUE Values:** Some OPC servers return a TRUE value as -1. If your OPC server is returning TRUE values as -1, modify the following scaling settings: ◦ **Hi Engineering Units**: Enter `0`. ◦ **Lo Engineering Units**: Enter `1`. ◦ **Hi Scaling Value**: Enter `0`. ◦ **Lo Scaling Value**: Enter `-1`. ◦ **Input Scaling**: Enable this option.
Hi Scaling Value	The upper limit of the span of the input value.
Lo Scaling Value	The lower limit of the span of the input value.

Table 43. The Collector Compression Section

Field	Description
Collector Compression	Indicates whether collector compression *(on page 1379)* is enabled.
Collector Deadband and **Deadband value**	The current value of the compression deadband. This value can be computed as a percent of the span, centered around the data value or given as an absolute range around the data value.

Field	Description
	Note: Some OPC servers add and subtract the whole deadband value from the last data value. This effectively doubles the magnitude of the deadband compared to other OPC servers. To determine how your specific server handles deadband, refer to the documentation of your OPC server. **Example:** Suppose the engineering units are 0 to 200. Suppose the deadband value is 10%, which is 20 units. If the deadband value is 10% and the last reported value is 50, the value will be reported when the current value exceeds 50 + 10 = 60 or is less than 50 - 10 = 40. Note that the deadband (20 units) is split around the last data value (10 on either side.) Alternatively, you could specify an absolute deadband of 5. In this case, if the last value was 50, a new data sample will be reported when the current value exceeds 55 or drops below 45. If compression is enabled and the deadband is set to zero, the collector ignores data values that do not change and records any that do change. If you set the deadband to a non-zero value, the collector records any value that lies outside the deadband. If the value changes drastically, a pre-spike point may be inserted. For information, refer to Enable Spike Logic *(on page)*.
Engineering Unit	Converts the deadband percentage into engineering units and displays the result. This value establishes the deadband range that is centered around the new value. This field represents a calculated number created to give an idea of how large a deadband you are creating in engineering units. The deadband is entered in percentage and Historian converts the percentage in to engineering units.
Compression Timeout and **Compression Timeout Interval**	Indicates the maximum amount of time the collector will wait between sending samples for a tag to the archiver. This time is maintained per tag, as different tags report to the archiver at different times.

Field	Description
	For polled tags, this value should be in multiples of your collection interval. After the timeout value is exceeded, the tag stores a value at the next scheduled collection interval, and not when the timeout occurred. For example, if you have a 10-second collection interval, a 1-minute compression timeout, and a collection that started at 2:14:00, if the value has not changed, the value is logged at 2:15:10 and not at 2:15:00. For unsolicited tags, a value is guaranteed in, at most, twice the compression timeout interval. A non-changing value is logged on each compression timeout. For example, an unsolicited tag with a 1-second collection interval and a 30-second compression timeout is stored every 30 seconds. A changing value for the same tag may have up to 60 seconds between raw samples. In this case, if the value changes after 10 seconds, then that value is stored, but the value at 30 seconds (if unchanged) will not be stored. The value at 60 seconds will be stored. This leaves a gap of 50 seconds between raw samples which is less than 60 seconds. Compression timeout is supported in all collectors except the PI collector.

Table 44. The Archive Compression Section

Field	Description
Archive Compression	Indicates whether archive compression *(on page 1379)* is enabled. If enabled, Historian applies the archive deadband settings against all reported data from the collector.
Archive Deadband and **Deadband value**	The current value of the archive deadband, expressed as a percent of span or an absolute number.
Engineering Unit	Converts the deadband percentage into engineering units and displays the result. This value establishes the deadband range that is centered around the new value.

Field	Description
Compression Timeout and **Compression Timeout Interval**	The maximum amount of time from the last stored point before another point is stored, if the value does not exceed the archive compression deadband. The data archiver treats the incoming sample after the timeout occurs as if it exceeded compression. It then stores the pending sample.

Table 45. The Advanced Section

Field	Description
Time Assigned By	The source of the timestamp for a data value is either the collector or the data source. All tags, by default, have their time assigned by the collector. When you configure a tag for a polled collection rate, the tag is updated based on the collection interval. For example, if you set the collection interval to 5 seconds with no compression, then the archive will be updated with a new data point and timestamp every 5 seconds, even if the value is not changing. However, if you set the **Time Assigned By** field to **Source** for the same tag, the archive only updates when the device timestamp changes. For example, if the poll time is still 5 seconds, but if the timestamp on the device does not change for 10 minutes, no new data will be added to the archive for 10 minutes. **Note:** This field is disabled for Calculation and Server-to-Server tags.
Time Zone Bias	The number of minutes from GMT that should be used to translate timestamps when retrieving data from this tag. For example, the time zone bias for Eastern Standard time is -300 minutes (GMT-5). This field is not used during collection. Use this option if a particular tag requires a time zone adjustment during retrieval other than the client or server time zone. For example, you could retrieve data for two tags with different time zones by using the tag time zone selection in the iFIX chart.

Field	Description
Time Adjustment	If the Server-to-Server collector is not running on the source computer, select the **Adjust for Source Time Difference** option to compensate for the time difference between the source archiver computer and the collector computer. **Note:** This field only applies to tags associated with the Server-to-Server collector that use a polled collection type.

Table 46. The Security Section

Field	Description
Read Group	The Windows security group that can retrieve the tag data and plot it in a trend chart. For example, if you select a group with power users, in addition to members of the iH Security Admins group, only a member of the power users group will be able to read data for that tag. Even a member of the iH Readers group will not be able to access data for that tag, unless they are also defined as a member of the power users group.
Write Group	The Windows security group that can write tag data (for example, using the Excel Add-in for Historian).
Administer Group	The Windows security group that can create, modify, and delete the tag.
For more information, refer to implementing tag-level security *(on page)*. **Note:** When it comes to the group security, the security settings applied at the tag level, if any, take the precedence over those at the data store level.	

Note:
If you are using domain groups (instead of local groups), the **Read Group**, **Write Group**, and **Administer Group** fields contain only the groups whose names begin with iH<space> (case-sensitive). Therefore, ensure that the group that you want to use begins with iH<space>.

Table 47. The Delta Query Section

Field	Description
Delta Max Value	The maximum value that a tag can have. It also called the rollover point of the counter or totalizer. If the tag values exceed MaxValue, the counter is reset to the minimum value. If you do not provide MaxValue, the delta query cannot check for a positive counter wrap.
Delta Min Value	The minimum value that a tag can have. If the tag values are less than MinValue (and the counter is going in the negative direction), the tag values are reset to MaxValue. If you do not provide MinValue, 0 is considered.
Delta Max Positive RPH	The maximum rate per hour between two consecutive data points in the positive direction. If two consecutive data points exceed this value, they are not considered in a delta query.
Delta Max Negative RPH	The maximum rate per hour between two consecutive data points in the negative direction. If two consecutive data points exceed this value, they are not considered in a delta query. The Delta Max Positive RPH and Delta Max Negative RPH values are used to determine if a counter wrap has occurred or if the counter has been manually reset. They help ignore data points whose values increase or decrease drastically.

For information on how these values are calculated, refer to Counter Delta Queries *(on page)*.

The Spare Fields section

Spare configuration enables you to add additional configuration to the tag using the **Spare Field 1** to **Spare Field 5** fields in all the collectors except in a Server-to-Server collector, Server-to-Server distributor, and an OSI PI distributor.

- In case of an OSI PI distributor, data is read from the Historian tag displayed in the **Source Address** field and sent to the OSI PI tag name displayed in the **Spare Field 1** field. To control the source and destination tags, change the **Source Address** and **Spare Field 1** values. You can add or update values in the remaining spare fields.
- In case of Server-to-Server collector and Server-to-Server distributor, you can update the **Spare Field 1** to **Spare Field 4** values, but the **Spare Field 5** field is used only for internal purposes. Therefore, do not update the **Spare Field 5** field.

The TAG ALIAS Section

Contains a list of the old names of the tag that you have renamed using an alias. For more information, refer to Rename a Tag *(on page 1417)*.

Configure Multiple Tags

This topic describes how to select multiple tags and configure their properties. This allows you to select two or more tags and configure their relevant properties at once. By default, 100 tags are listed at once in the grid. If you need to configure more than 100 tags simultaneously, you can use the page numbers at the bottom-right corner of the grid to navigate to the next available tags and select them as needed. Depending on the data types of the tags you select, all the properties that are relevant to the selected tags will be available in the **DETAILS** section for configuration.

Before you begin the configuration of multiple tags, know the following:

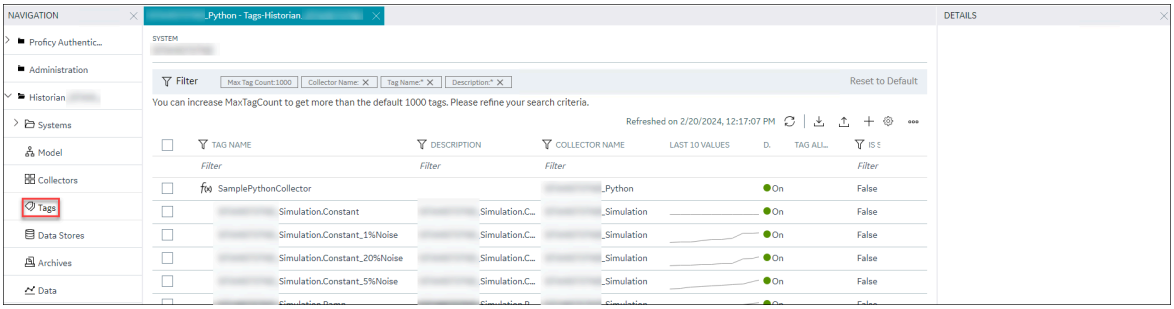
- When you select multiple tags, only the common properties will be displayed in the **DETAILS** section.
- The configuration values displayed in the **DETAILS** section will be of the last tag that is selected. However, the properties you update will be applied to all the other selected tags.
- When you configure multiple tags, only the configured properties are updated, and all the other properties remain unchanged.
- When you select multiple tags, aliases are disabled.

The table below provides the properties that will be disabled based on the selection of different tag data types.

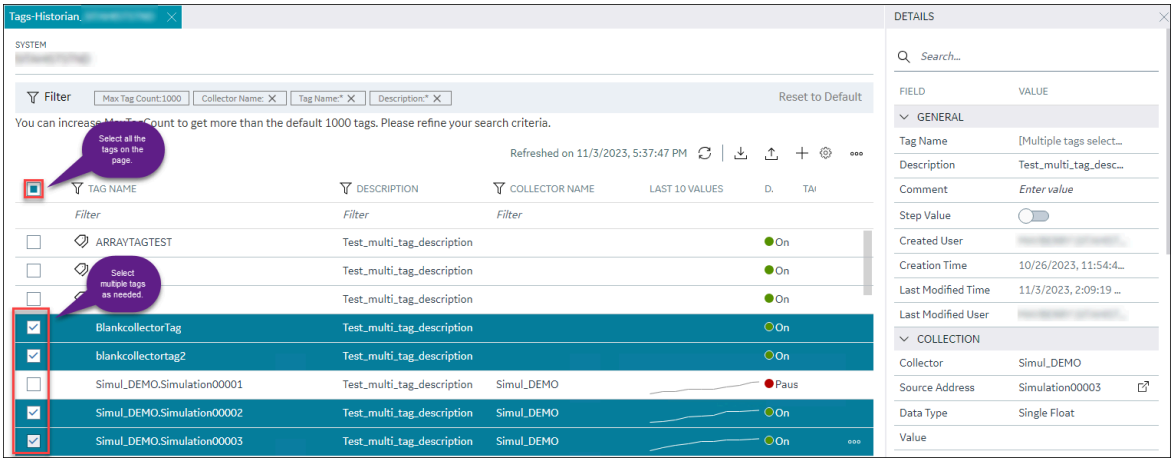
Tag Data Type/ Tag Type	Properties Disabled
Array, Blob, Multifield	Compression, Scaling, Calculation, and Delta mode.

Tag Data Type/ Tag Type	Properties Disabled
Fixed string, Variable string	Compression, Scaling, Calculation, and Delta mode.
Calculation	None.
Calculation combined with other tag data types	Condition based collection, Time assigned by, and other relevant properties. For example, if you select Calculation, Array, and Blob, Condition based collection, Time assigned by, Compression, Scaling, Calculation, and Delta mode are disabled.
Non-calculation, Array, Multifield	All the properties other than General, Collection, Scaling, Compression, Advanced, Security, Delta, and Spare.
Multifield	Array tag.
UDT, Enum tags	Enumerated set.
Array, Blob, Scaled, Fixed string, Variable string	Enumerated set.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.



3. To select multiple tags, select the check boxes corresponding to the tags as needed. Alternatively, to select all the available tags, select the check box in the upper-left corner in the grid header.



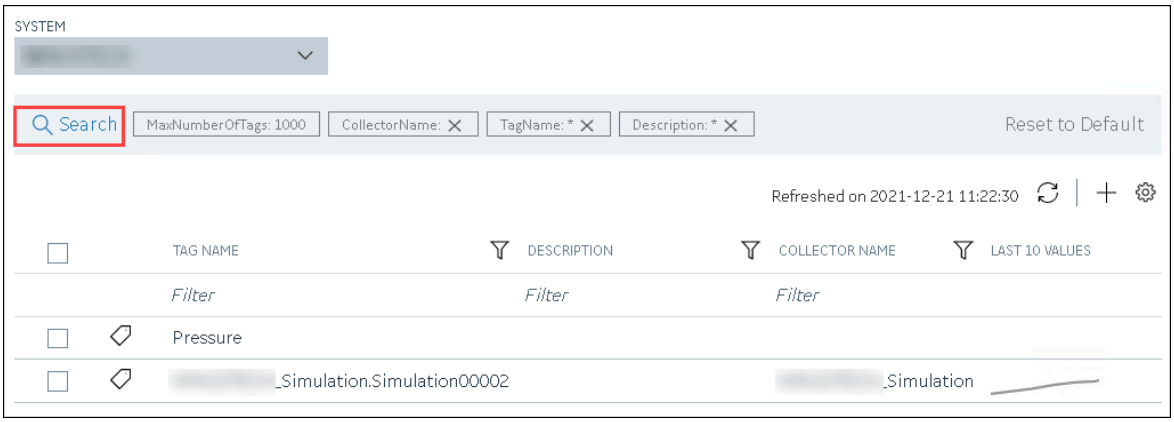
4. In the **DETAILS** section, edit the available properties as needed.
5. After you edit, in the top-left corner of the main ribbon bar, select **Save**.

Access the Trend Chart of Tag Values

This topic describes how to access the values of a tag in a trend chart. The difference in the timestamp of consecutive values depends on the time resolution of the tag. For example, if the time resolution is seconds, the timestamp of consecutive values of the tag will be one second apart.

You can plot the trend chart for up to 10 tags at a time.

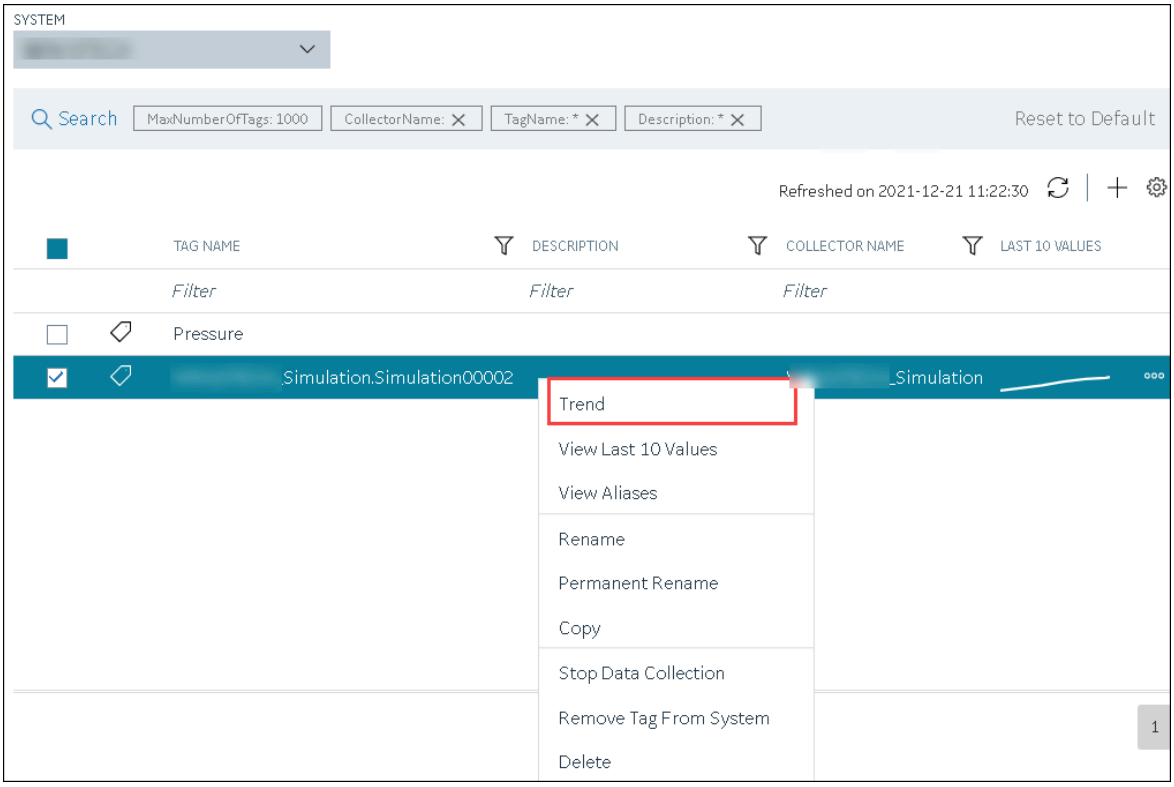
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.
3. If you want to narrow down the search results, select **Search**.



Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*).

The list of tags are filtered based on the search criteria.

4. If you want to access the trend chart of a single tag, right-click the tag (or select ⋯), and then select **Trend**.



If you want to access the trend chart for multiple tags, select the check boxes corresponding to the tags, right-click (or select ⋯), and then select **Trend**. You can select up to 10 tags.
The tag values are plotted on a trend chart. You can switch between the trend view and the table view.

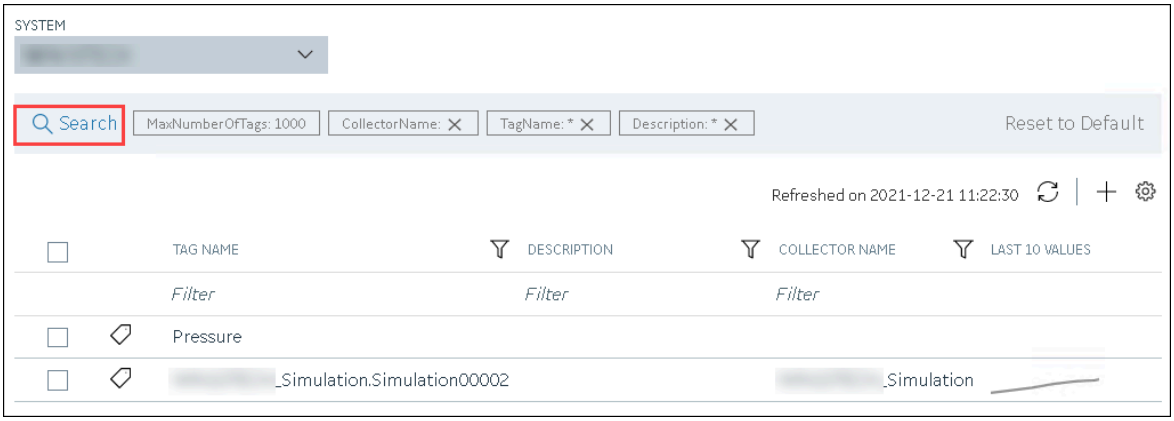
> **Tip:**
> You can also filter the chart by changing the duration, sampling type, time interval, and so on by selecting ▽.

Access the Last 10 Values of a Tag

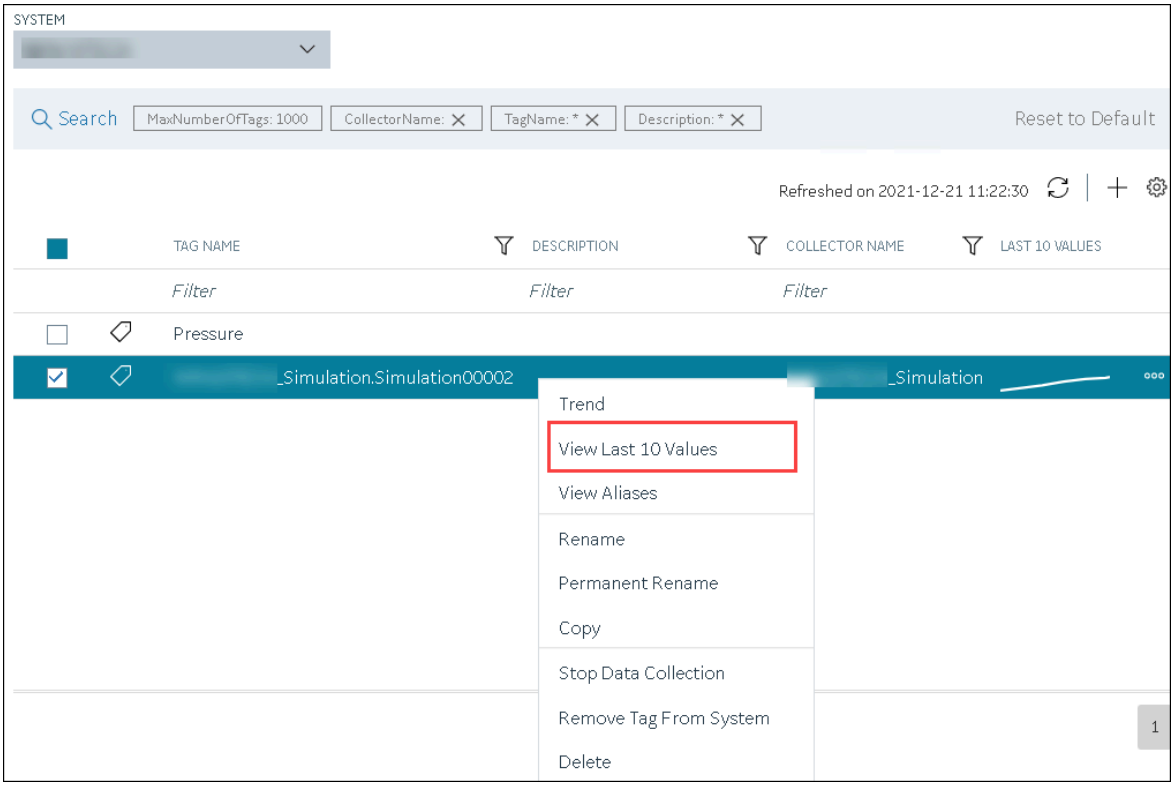
This topic describes how to access the last 10 values of a tag up to the current time. The difference in the timestamp of consecutive values depends on the time resolution of the tag. For example, if the time resolution is seconds, the timestamp of consecutive values of the tag will be one second apart.

Note:
If a tag name contains a comma or a semicolon, you cannot view the last 10 values of the tag.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.
3. If you want to narrow down the search results, select **Search**.



   Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*).
   The list of tags are filtered based on the search criteria.
4. If you want to access the last 10 values of a single tag, right-click the tag (or select), and then select **View Last 10 Values**.



The last 10 values of the tag appear, along with the timestamp and quality of each value. You can switch between the trend view and the table view.

5. If you want to access the last 10 values of multiple tags, select the check boxes corresponding to the tags, right-click (or select ⋯), and then select **Trend**. You can select up to 10 tags.

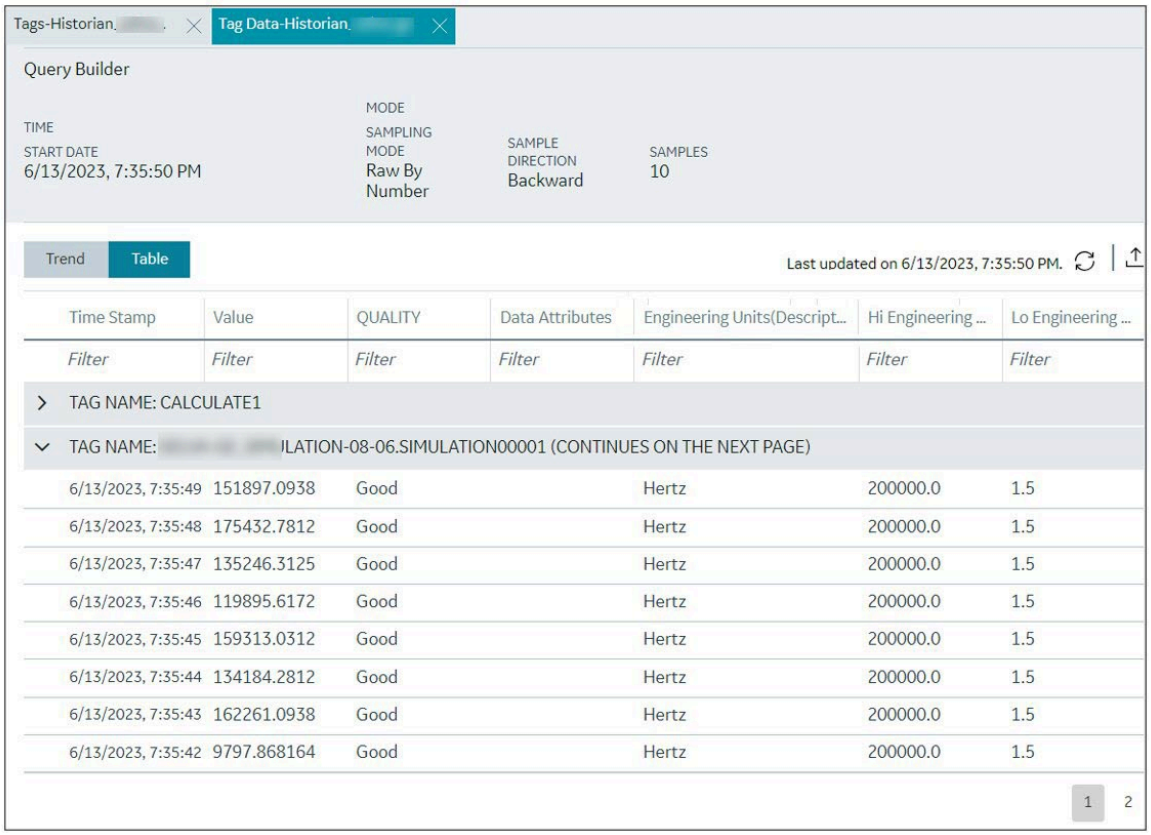
   In table view you can view data attributes which are introduced to store the 128-bit subquality for every sample.

> **Note:**
> SCADA applications such as Habitat support data samples with several quality types. To support such SCADA applications, Historian is now enhanced to store up to 128-bit quality types, which are stored in the data attributes. These attributes are extended qualities that you can store more than the regular qualities and subqualities (such as good and bad). In addition to regular qualities, the HAB collector collects extends qualities such as replaced, suspect, garbage, old, and so on.

The Data Attributes are displayed in the table view along with Timestamp, Value, and Quality. Data Attributes are supported for Current Value, Raw by Number, Raw by Time, Lab, and Lab to Raw. In addition:

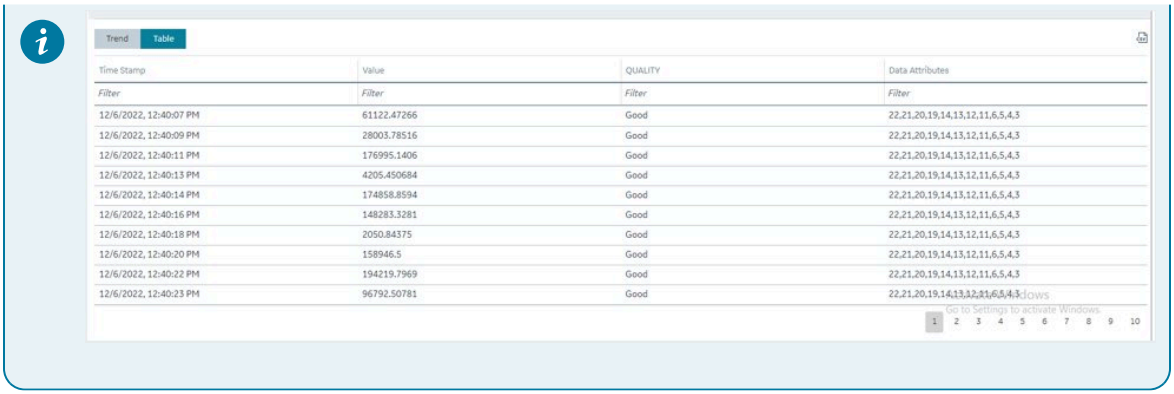
- For an array tag, all the values in the array appear for each timestamp.
- For a tag using an enumerated set, values of all the states appear for each timestamp.
- For a tag using a user-defined data type (UDT), values for all the fields appear for each timestamp.

6. For the selected tag, to view the results in a table, select **Table**.

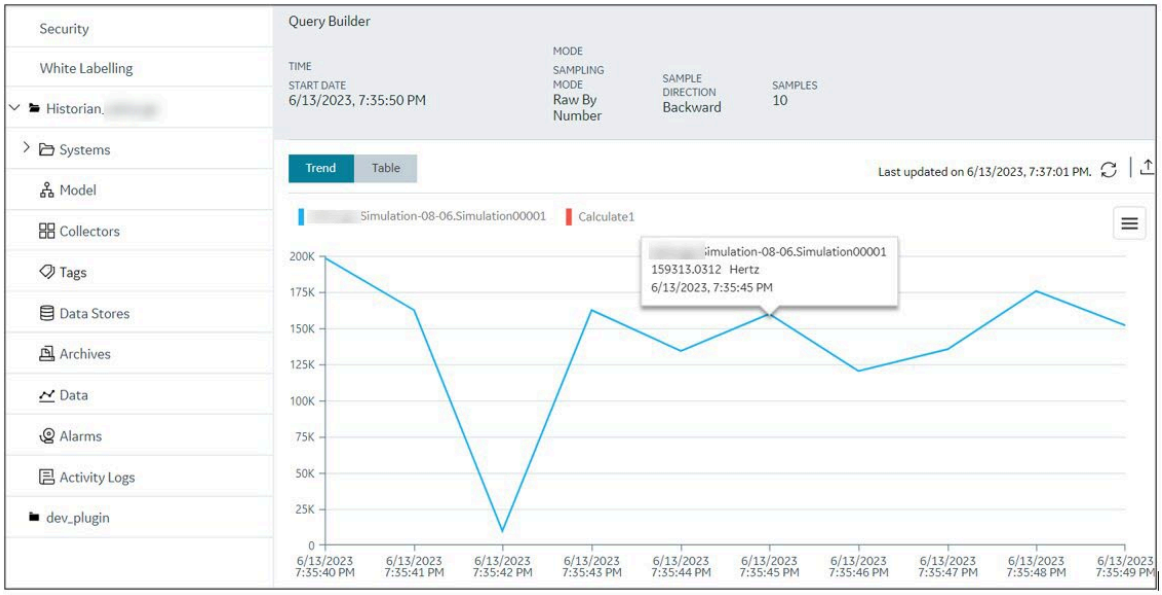


Tip:

You can also filter the values by changing the duration, sampling type, time interval, engineering units, and so on by selecting .



7. For the selected tag, to view the results in a trend chart, select **Trend**.

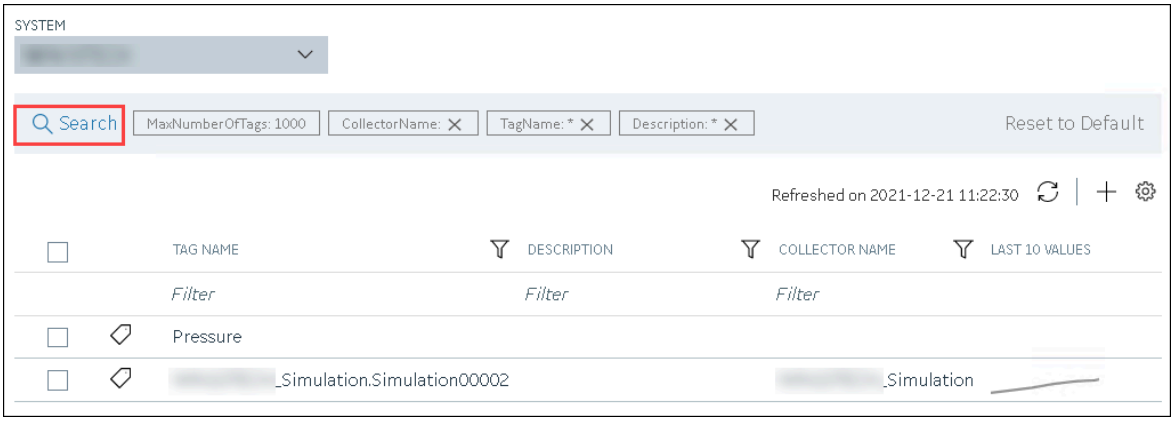


Access a Tag Alias

After you rename a tag, the old name is called the tag alias. You can retrieve tag data using the tag alias as well. When you copy a tag, the tag alias is also captured to aid in an audit trail.

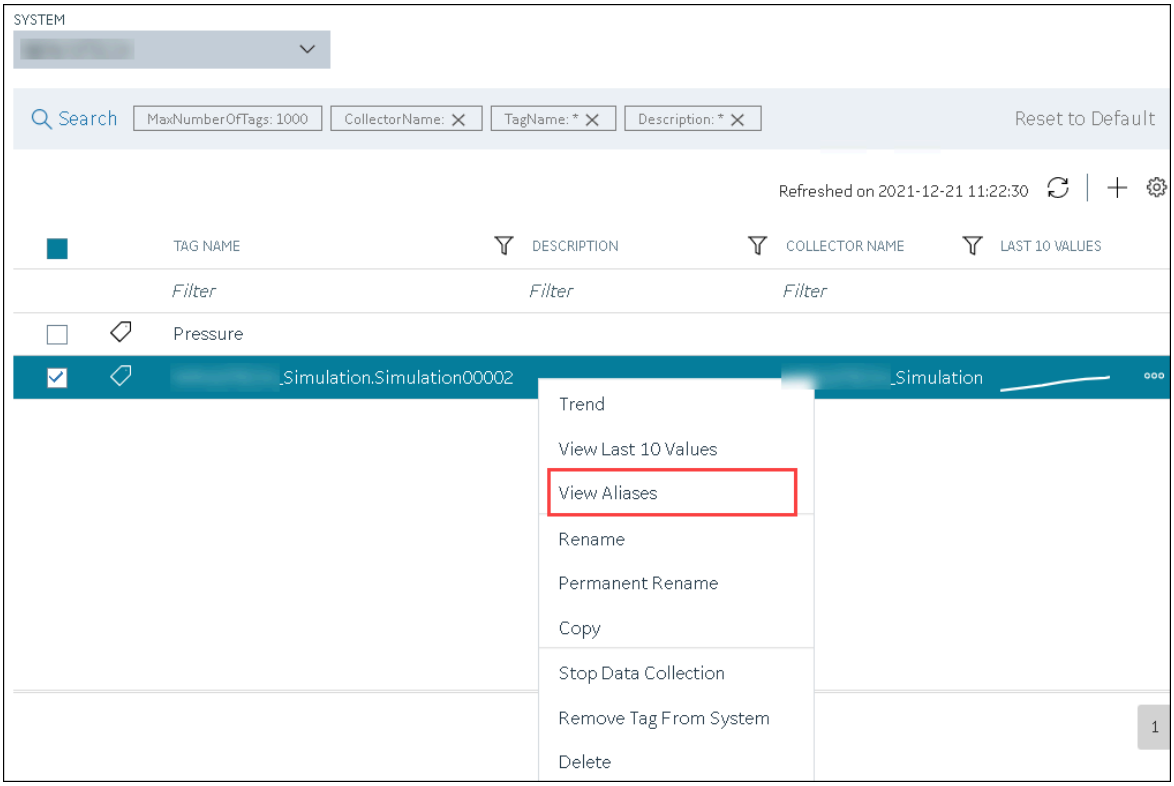
Note:
If a tag name contains a comma or a semicolon, you cannot view the tag alias.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.
3. If you want to narrow down the search results, select **Search**.



Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*). The list of tags are filtered based on the search criteria.

4. Right-click the tag whose alias you want to access (or select ⋯), and then select **View Aliases**.



Alternatively, you can select  in the **TAG ALIAS** column.
All the tag aliases of the selected tag appear.

Export Tags as a CSV File

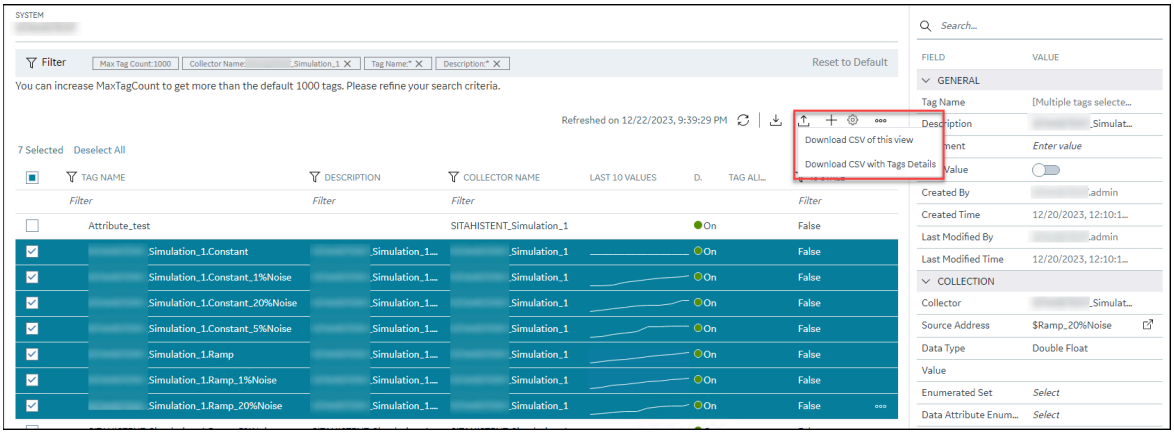
This topic describes how to export tags as a CSV file. You can export tags from Configuration Hub as a CSV file and add/modify tags in bulk and then import them. You can also import the CSV file that was exported using Excel Add-in.

Note:
Similarly, you can also export enumerated sets, and user-defined types from the **Manage Enumerated Sets** and **Manage User-Defined Types** windows.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears, displaying the corresponding details.
3. Select and then select any one of the following options:

Option	Description
Download CSV of this View	Select this option if you want to download the selected tags and their corresponding details as listed in the tags grid.
Download CSV with Tag Details	Select this option if you want to download the selected tags and all their details, including configurations, from the **DETAILS** section.

Note:
Irrespective of the number of tags you select, all the available tags will be exported.



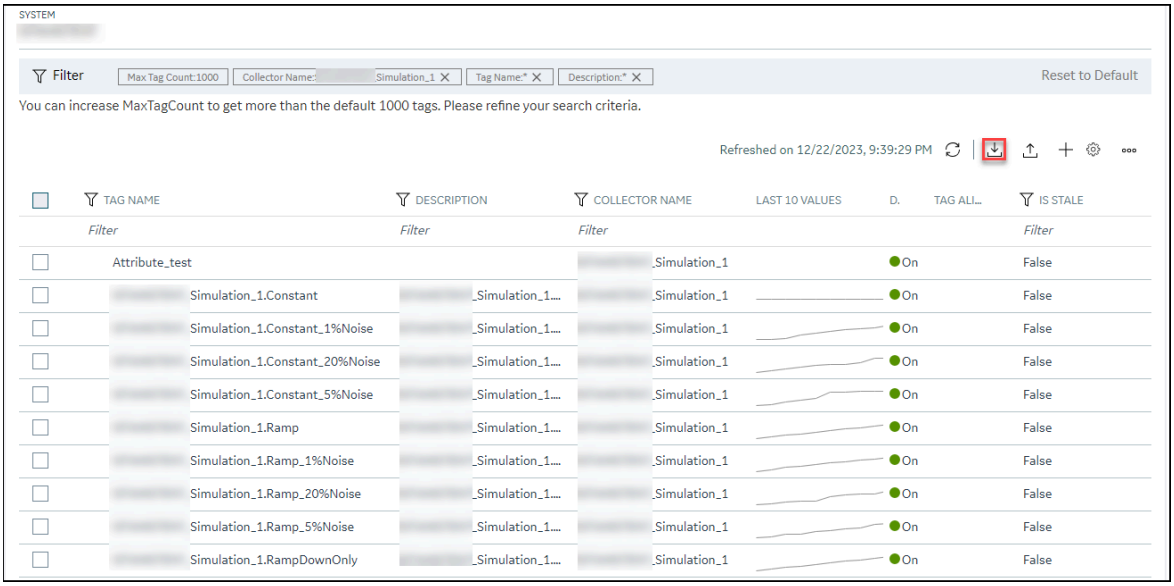
4. Enter a name for the file and save it in a location as needed.

Import Tags from a CSV File

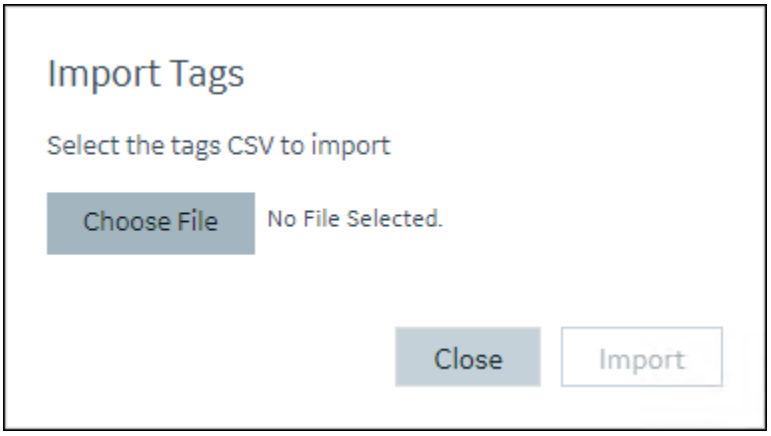
This topic describes how to import tags into Configuration Hub from a CSV file. You can either export tags and their details as a CSV file and edit them, and then import them back, or you can import tags and their details from another CSV file that you created externally, like Excel Add-in.

Note:
Similarly, you can also import enumerated sets, and user-defined types from the **Manage Enumerated Sets** and **Manage User-Defined Types** windows.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears, displaying the corresponding details.
3. In upper-right corner of the grid, select .



The **Import Tags** page appears.



4. Select **Choose File**, and then select the CSV file as needed.

> **Note:**
> If you import any irrelevant CSV file, the import will fail and you will be notified.

5. Select **Import**.
   The tags and their details are imported.

Rename a Tag

To rename a tag, you must be a member of the administrator's group with tag-level security.

When you rename a tag, you can choose between the following options:

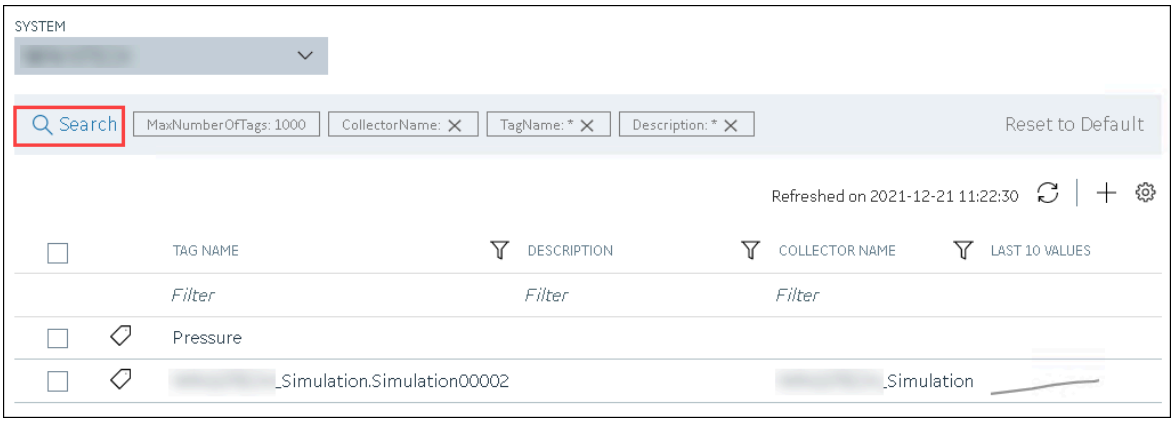
- **Rename using an alias:** In this case, the old name is called the tag alias. You can retrieve tag data using the tag alias as well. When you copy a tag, the tag alias is captured as well to aid in an audit trail.

> **Note:**
> If a tag name contains a comma or a semicolon, you cannot view the tag alias.

- **Rename permanently:** In this case, the old name is no longer captured. Therefore, you can create another tag with this old name. You cannot store and forward data using the old name. This implies that data for the tag is collected separately for the new name.

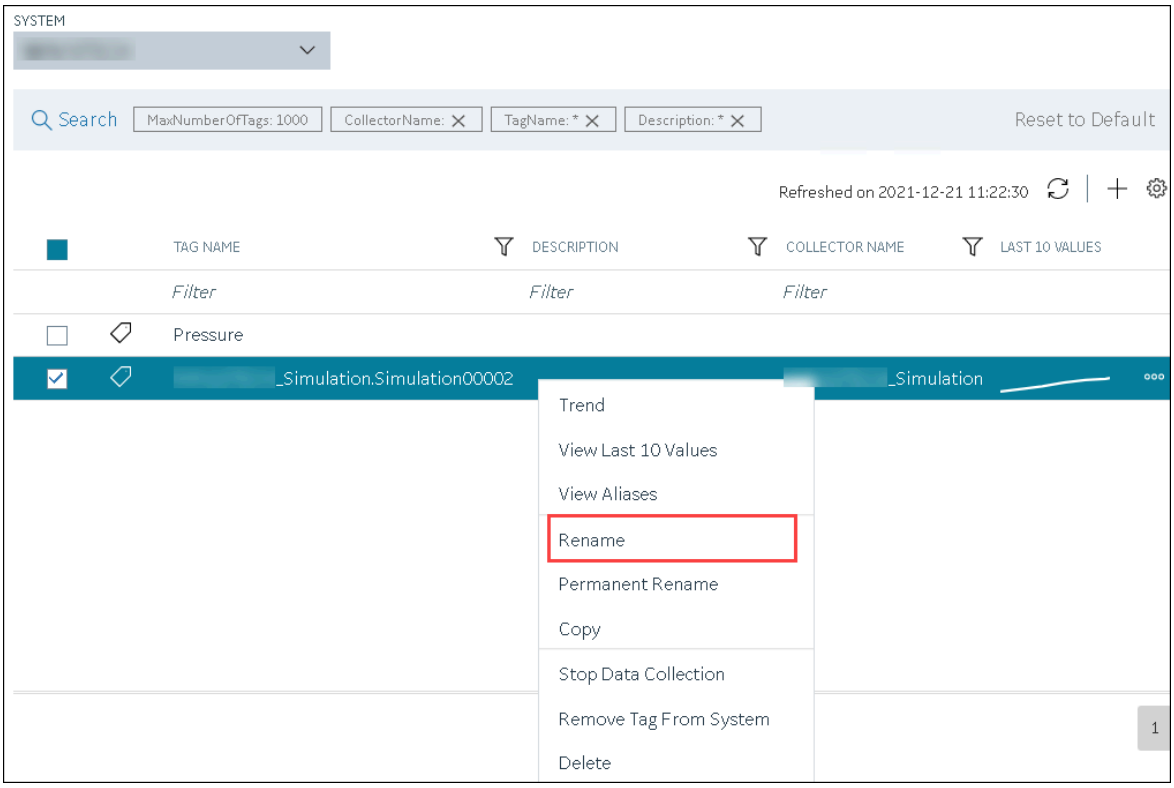
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.

3. If you want to narrow down the search results, select **Search**.

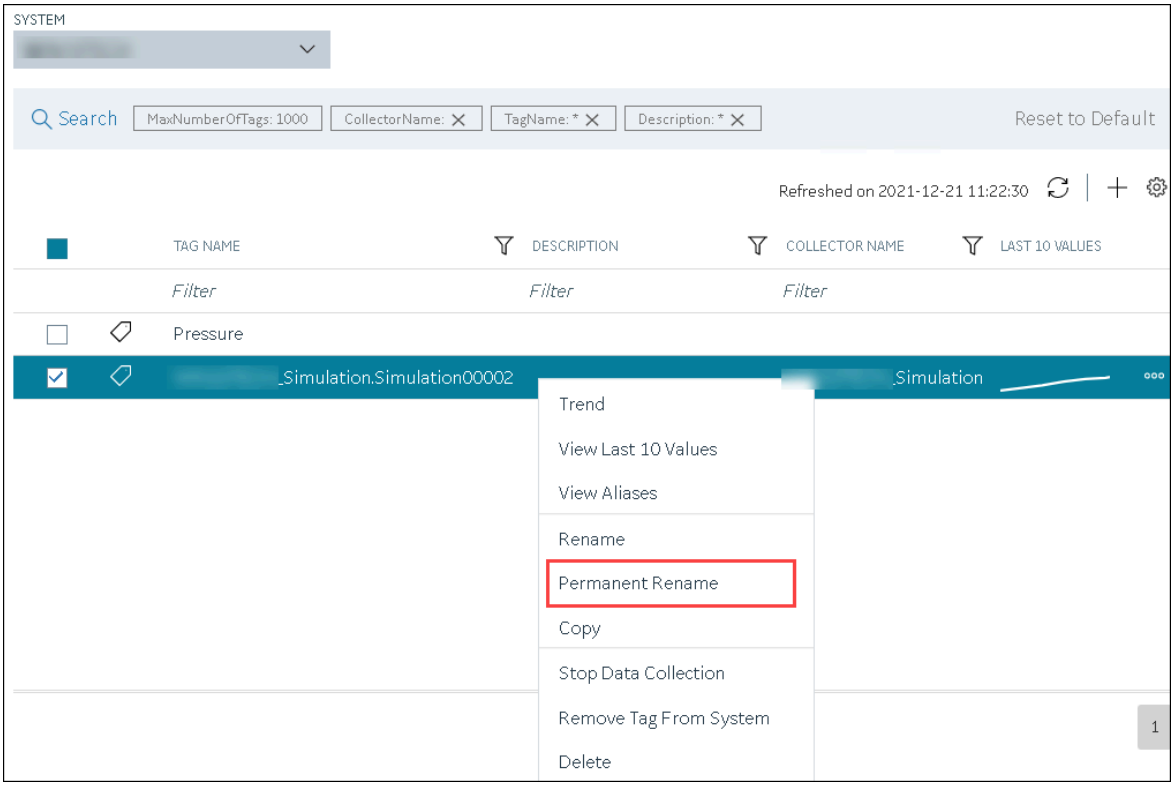


Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*). The list of tags are filtered based on the search criteria.

4. Right-click the tag that you want to rename (or select ⋯).
5. If you want to rename the tag using an alias, select **Rename**.



If you want to rename the tag permanently, select **Permanent Rename**.



The **Rename Tag: <tag name>** window or the **Permanent Rename Tag: <tag name>** window appears.

6. Enter the new name of the tag, and then select **Rename**. The tag name must be unique in the Historian server.

   The tag is renamed. If you have renamed using an alias, the **TAG ALIAS** column displays , indicating that the tag now has an alias.

If you have renamed the tag permanently:

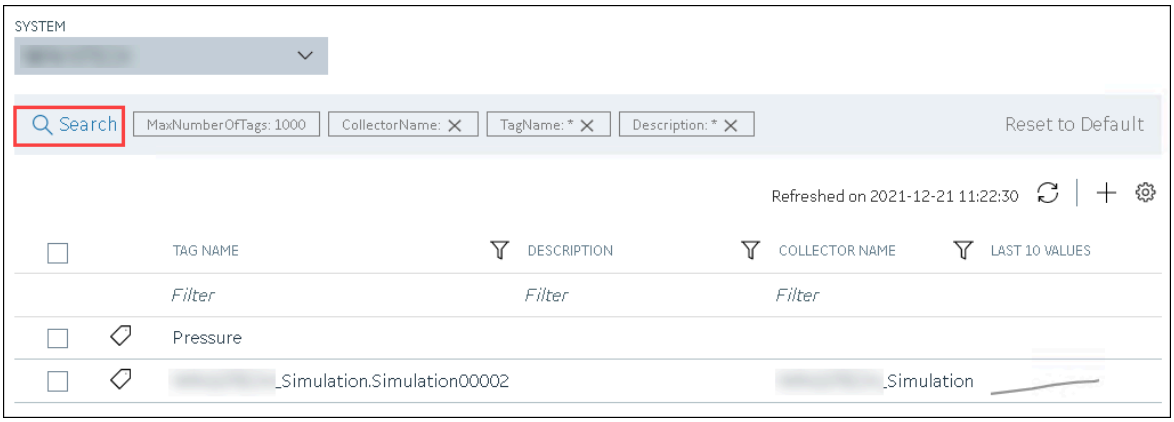
- If the tag is used as a trigger, reassign the trigger.
- Restart the collector instance *(on page 1358)*.

Copy a Tag

If you want to create a tag with the same properties as another one, you can copy it, and then modify the properties as needed. When you copy a tag, the tag alias is captured as well to aid in an audit trail.

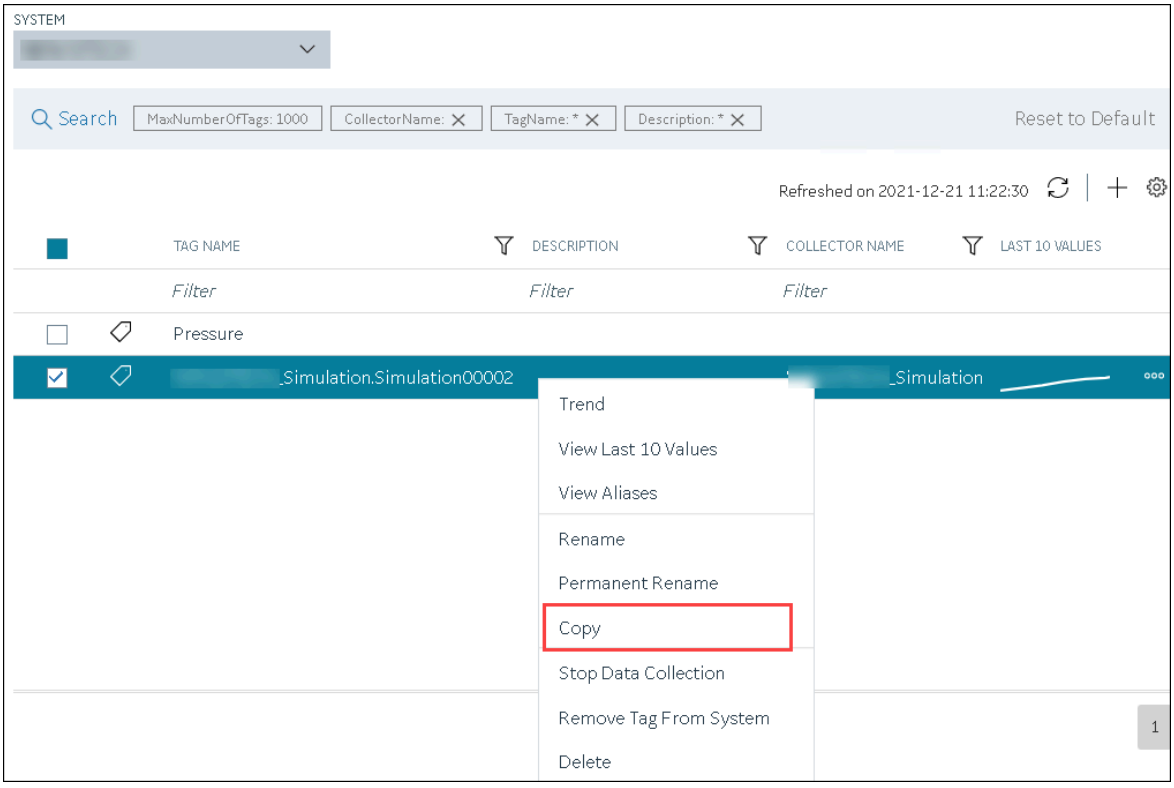
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.

3. If you want to narrow down the search results, select **Search**.



Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*). The list of tags are filtered based on the search criteria.

4. Right-click the tag that you want to copy (or select ⋯), and then select **Copy**.



The **Copy Tag: <tag name>** window appears.

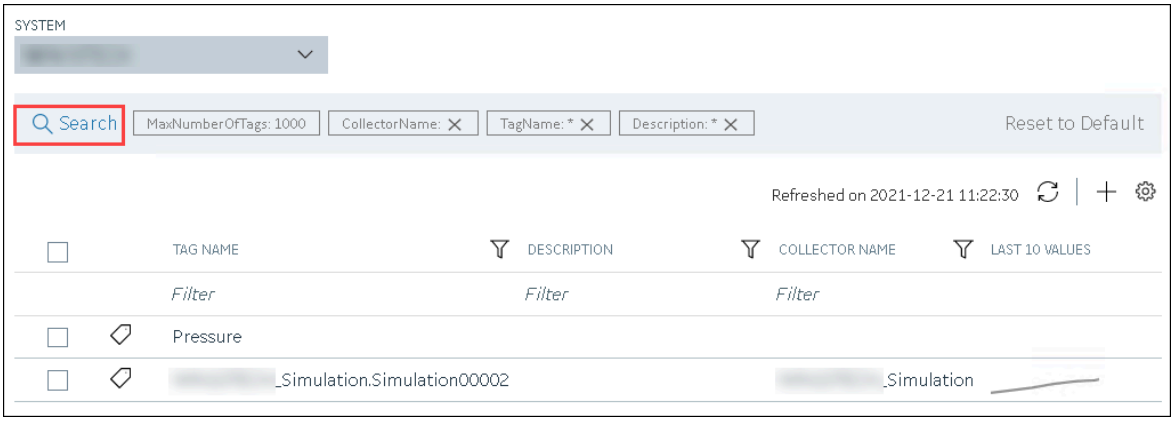
5. In the **NEW TAG NAME** field, provide a name for the tag. A value is required and must be unique for the Historian system.

6. Select **Copy**.
   The tag is copied, inheriting the properties of the original tag. In addition, data collection begins for the tag.

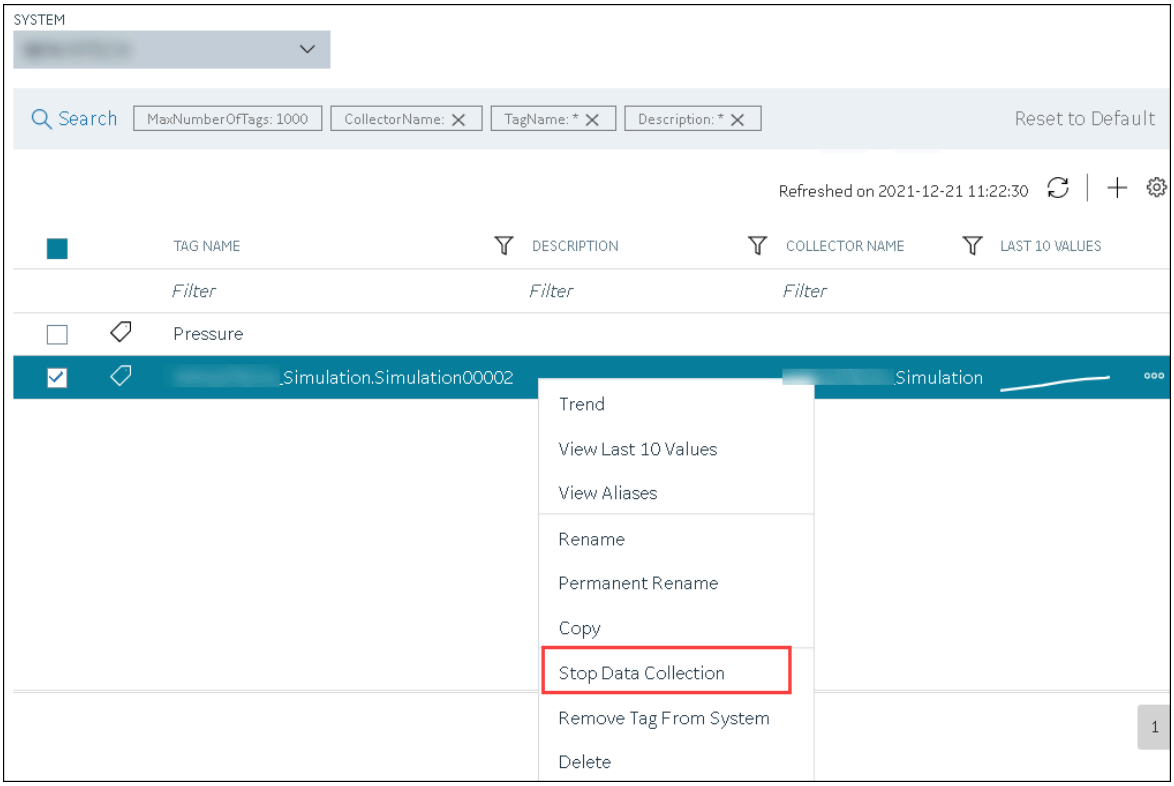
Stop the Data Collection of a Tag

If you want to stop using a tag for a while, you can stop the data collection of the tag, which allows you to resume the data collection later. If, however, you no longer want to use the tag or its data, you can remove it from the system *(on page 1423)* or delete it *(on page 1424)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.
3. If you want to narrow down the search results, select **Search**.



   Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*).
   The list of tags are filtered based on the search criteria.
4. Right-click the tag for which you want to stop data collection (or select), and then select **Stop Data Collection**.



A message appears, asking you to confirm that you want to stop the data collection for the tag.

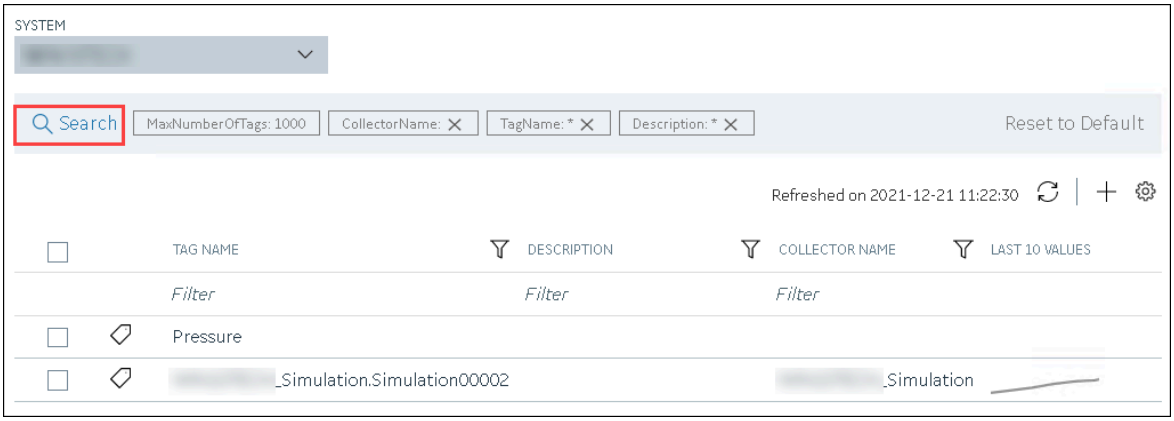
5. Select **Stop**.

   Data collection is stopped for the tag.

Start the Data Collection of a Tag

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.

   A list of all the tags appears.
3. If you want to narrow down the search results, select **Search**.



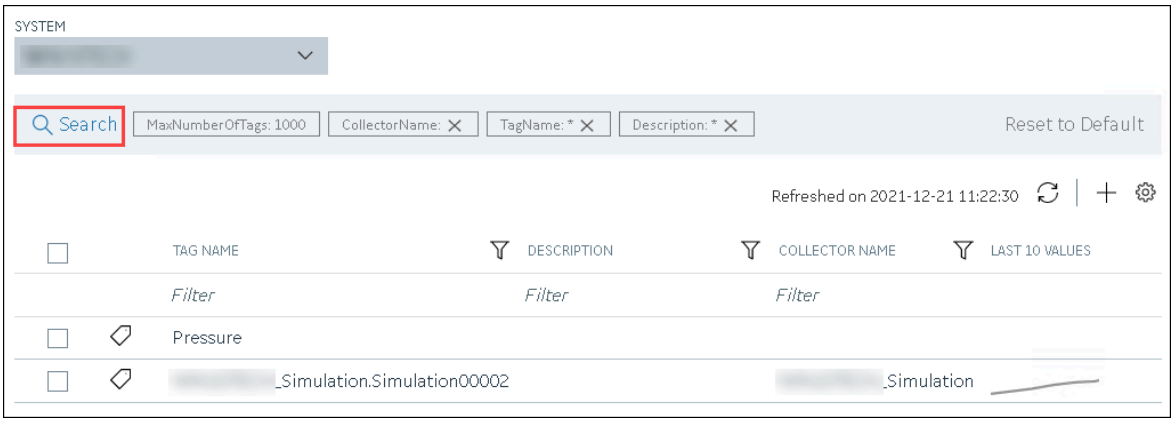
Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*).
The list of tags are filtered based on the search criteria.

4. Right-click the tag for which you want to start data collection (or select ⋯), and then select **Start Data Collection**.
   A message appears, asking you to confirm that you want to start the data collection for the tag.
5. Select **Start**.
   Data collection is started for the tag.

Remove a Tag from a System

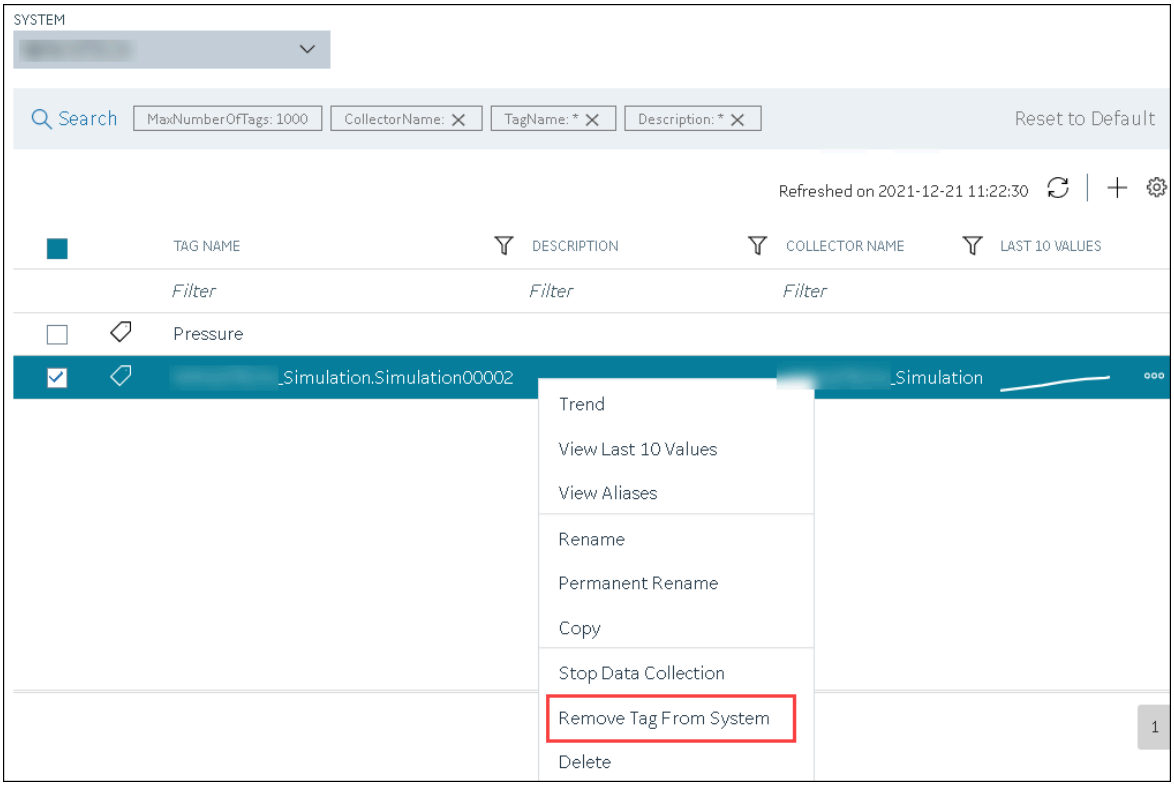
When you remove a tag from a system, the tag and its data will still be available. Therefore, you cannot create a tag with the same name. If, however, you no longer need the tag or its data, you can delete it *(on page 1424)*. Or, you can choose to stop the data collection *(on page 1421)* for the tag, which allows you to resume the data collection *(on page 1422)* later.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.
3. If you want to narrow down the search results, select **Search**.



Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*).
The list of tags are filtered based on the search criteria.

4. Right-click the tag that you want to remove (or select ⋯), and then select **Remove Tag From System**.



A message appears, asking you to confirm that you want to remove the tag from the system.

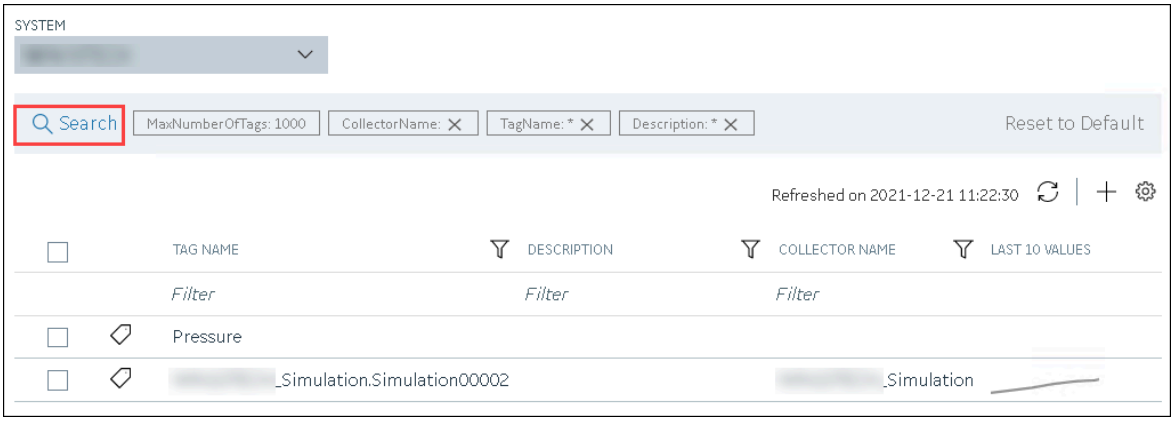
5. Select **Remove**.
   The tag is removed from the system.

Delete a Tag

If the tag that you want to delete is associated with a variable in a Historian model, remove the mapping between the variable and the tag.

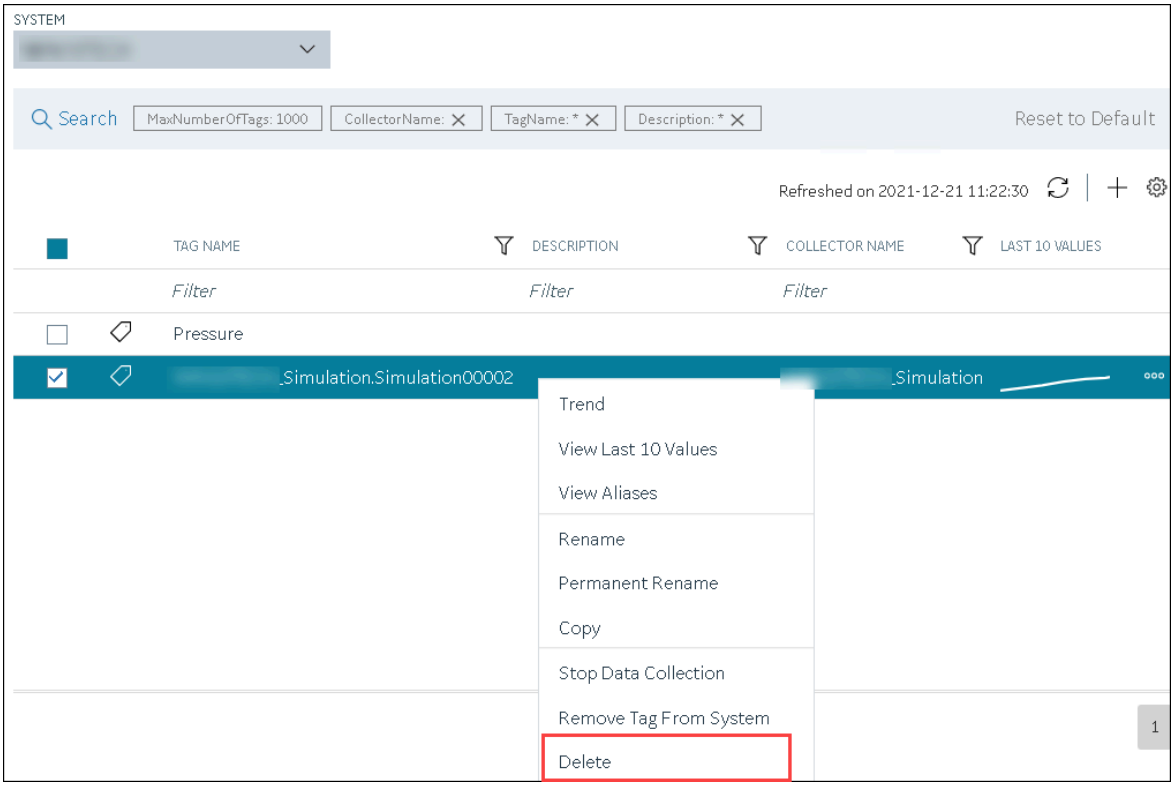
When you delete a tag, it is deleted from Historian, and the tag data will no longer be available. If, however, you want the tag data to be available, instead of deleting the tag, remove it from the system *(on page 1423)*. Or, you can choose to stop the data collection *(on page 1421)* for the tag, which allows you to resume the data collection *(on page 1422)* later.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
   A list of all the tags appears.
3. If you want to narrow down the search results, select **Search**.



Enter the search criteria, and then select **Search**. You can add more attributes by selecting **Add Attribute**. You can enter a name or a value partially or use the wildcard character asterisk (*). The list of tags are filtered based on the search criteria.

4. Right-click the tag that you want to delete (or select ⋯), and then select **Delete**.



A message appears, asking you to confirm that you want to delete the tag.

5. Select **Delete**.

The tag is deleted.

Managing Enumerated Sets

About Enumerated Sets

An enumerated data set provides an enhanced way of displaying data. It enables you to retrieve numeric data as string state values. You can use the string values in reports, charts, etc.

An enumerated set contains several states. A state is the number-string value pair in a set. It contains a set of numeric values and their corresponding string values. You can define an enumerated set for a single value or a range of values. These state values are defined for data states stored in Data Archiver. Data is retrieved using the value of the state. You have to define state values within a set to assign enumerated values.

Table 48. Example of a Single-Value Enumerated Set

State Name	State Value
Manual	0
Automatic	1

Table 49. Example of a Range-of-Values Enumerated Set:

State Name	State Value
ON	0 to 100
OFF	101 to 200

State names can be duplicated. If duplicated states exist, take precautions to avoid unpredictable results. For example, a tag is associated with an enumerated set defined as follows.

State Name	State Value
0	Open
1	Close
2	Close
2	Open

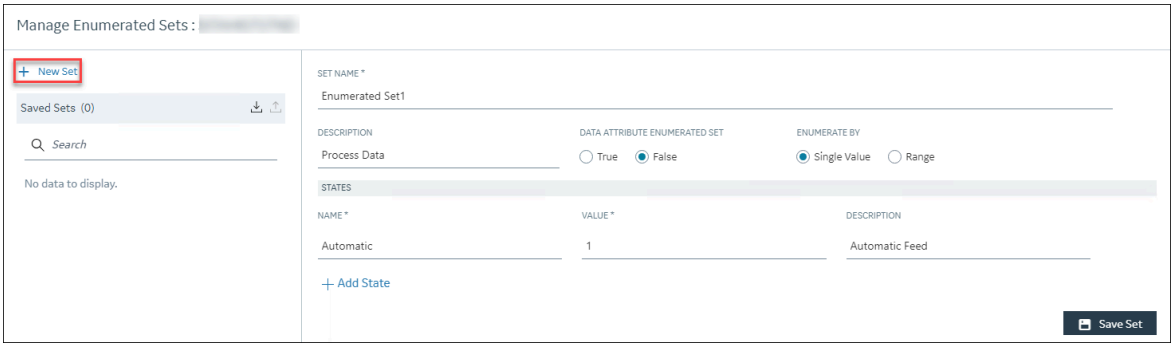
The server will return unpredictable results due to the State Name duplication for an input of 2.

Note:
You cannot assign an enumerated set to an array tag.

Create an Enumerated Set

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select , and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.

4. Select **New Set**, and enter values as described in the following table.
   The fields to create enumerated sets appear.

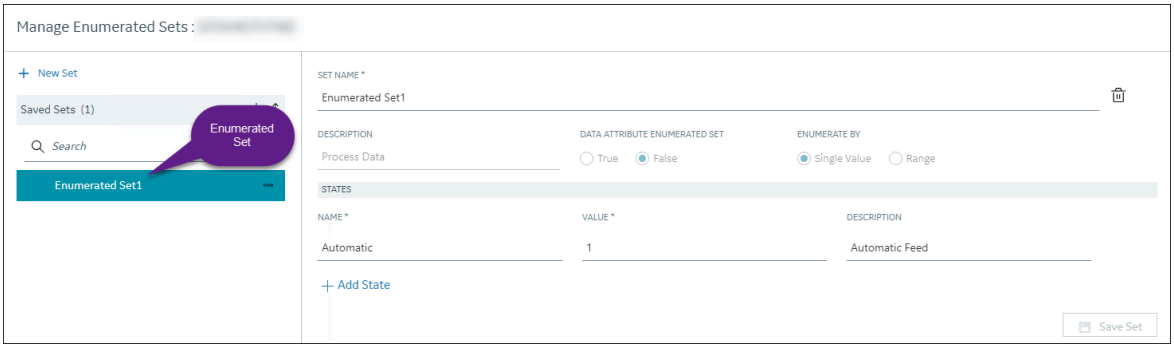


Field	Description
SET NAME	Enter a name for the set.
DESCRIPTION	Enter a description for the set.
DATA ATTRIBUTE ENUMERATED SET	This is not applicable if you are creating an enumerated set. Set this to **False**.

Field	Description
ENUMERATE BY	Specify whether you want to define a single value or a range of values. A single value is best used with integer values because they match exactly. A range of values can be used with floating point values because they may not match exactly due to rounding.
NAME	Enter a name for the state.
VALUE	Enter a numeric value for the state; string values such as on/off are not supported. This field appears only if you select **Single Value** in the **ENUMERATE BY** field.
START RANGE and **END RANGE**	Enter the start and end values of the range. Enter only numeric values; string values are not supported. These fields appear only if you select **Range** in the **ENUMERATE BY** field. If you want to assign ON for values 0-100, enter ON in the **NAME** field, and enter 0 and 100 in the **START RANGE** and **END RANGE** fields.
DESCRIPTION (under **STATES**)	Enter a description for the state.

5. For each state that you want to create, select **Add State**, and repeat the previous steps.
6. Select **Save Set**.
7. If needed, add more sets, and then select **Done**.

   The enumerated set is created.



Assign the enumerated set to a tag *(on page 1429)*.

Assign an Enumerated Set to a Tag

- Create the tag *(on page 1077)* for which you want to use an enumerated set.
- Create the enumerated set *(on page 1427)* that you want to assign to a tag.

If you assign an enumerated set to a tag, when you retrieve the tag data, instead of the actual values, the corresponding state names appear.

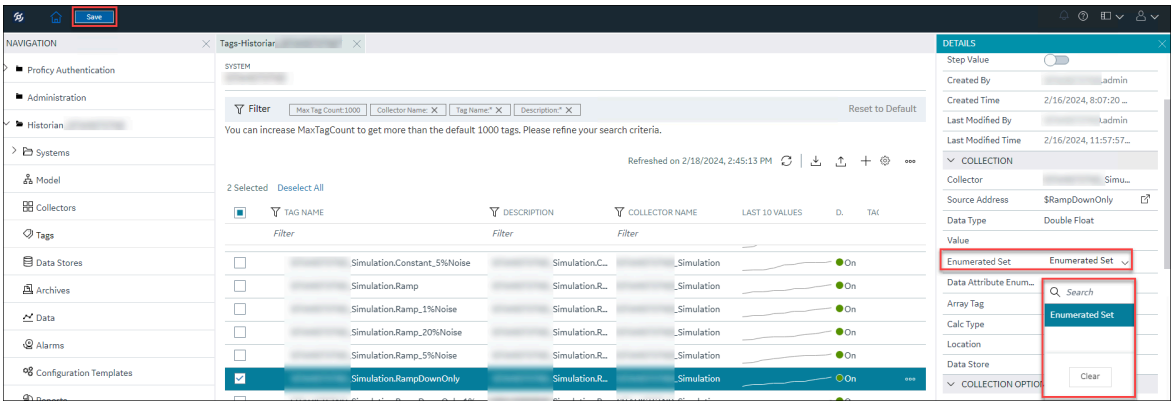
Example of an Enumerated Set

Suppose you have created the following states in an enumerated set:

State Name	State Range
ON	0 to 100
OFF	101 to 200

Suppose you assign the enumerated set to a tag. If the tag values are, say, 50, 100, 75, and 104, when you retrieve the tag values, ON, ON, ON, and OFF, respectively, are retrieved instead of the actual tag values.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select the tag to which you want to assign an enumerated set.
   The details of the tag appear in the **DETAILS** section.
4. Under **Collection**, select **Enumerated Set**.



5. In the upper-left corner of the page, select **Save**.
   The selected enumerated set is assigned to the tag.

Export an Enumerated Set

This topics describes how to export enumerated sets as a CSV file. You can export enumerated sets from Configuration Hub as a CSV file add/modify sets in bulk and then import them. You can also import the CSV file that was exported using Excel Add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select ⋯, and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.
4. In **Saved Sets**, select  .
5. Enter a name for the file and save it in a location as needed.

Import an Enumerated Set

This topic describes how to import enumerated sets into Configuration Hub from a CSV file. You can either export enumerated sets and their details as a CSV file and edit them, and then import them back, or you can import enumerated sets and their details from another CSV file that you created externally, like excel add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select ⋯, and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.
4. In **Saved Sets**, select  .
   The **Import Saved Sets** page appears.
5. Select **Choose File**, and then select the CSV file as need.

   > **Note:**
   > If you import any irrelevant CSV file, the import will fail and you will be notified.

6. Select **Import**.
   The enumerated sets and their details are imported.
7. In the **Manage Enumerated Sets: <system name>**, select **Done**.

Rename Enumerated Set

You can rename an enumerated set if needed.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select ⋯, and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.
4. Select the enumerated set that you want to rename.
   Details corresponding to the selected data set are displayed.
5. In **SET NAME**, rename the name of the set.
6. Select **Save Set**.
   The set name is renamed.
7. Click **Done**.
   The changes are saved.

Delete an Enumerated Set

This topic describes how to delete an enumerated set.

> **Note:**
> You cannot delete an enumerated set if it is assigned to a tag.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select ⋯, and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.
4. Select the enumerated set that you want to delete, or select ⋯, and then select **Delete Set**. Or, select 🗑 next to the Set name.
   A message appears, asking you to confirm that you want to delete the set.
5. Select **Delete**.
   The enumerated set is deleted.

Managing Data Attribute Enumerated Set

About Data Attribute Enumerated Set

A data attribute enumerated set enables you to specify whether you want to define a custom text for the sub-quality status and view it in the **Attributes** column instead of the value when you retrieve the tag data. For example, if your tag is receiving bit positions indicating the sub-quality status (that are, 1 for Old data, 2 for Bad data, and 30 for Good data), you can map the bit position to a custom text and assign it to a

set. So, when you view the actual values of the tag, the **Attributes** column will display the mapped custom text instead of the integer (the bit positions). For example, if you mapped a custom text name "good-16" to a value of 16, and the bit position of an incoming value is 16, it will display "good-16" in the **Attributes** column instead of 16.

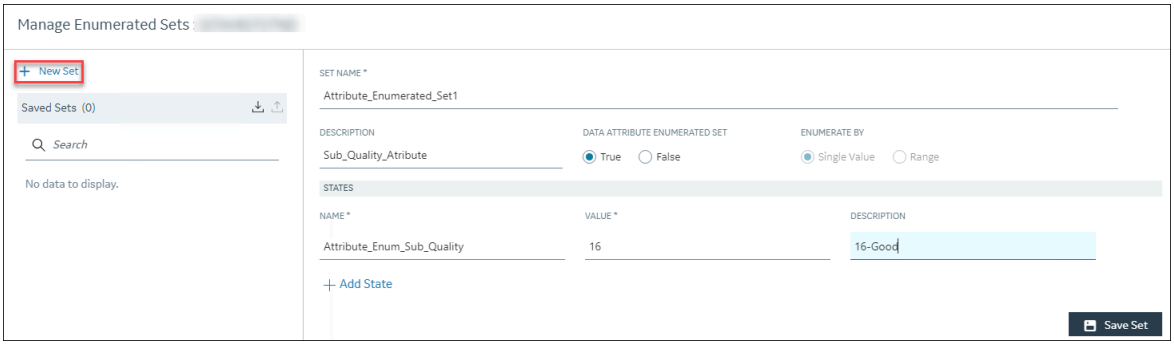
Table 50. Example of an Attribute Enumerated Set

State Name	State Value
Uninitiated	0
Old	1
Bad	2
Not in Service	10
Good	30

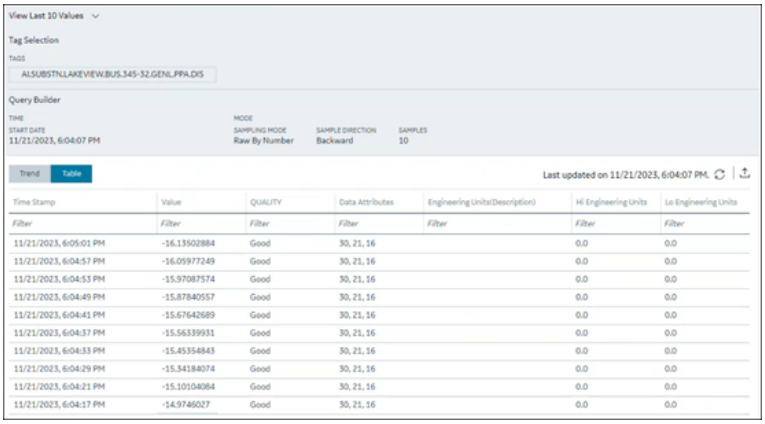
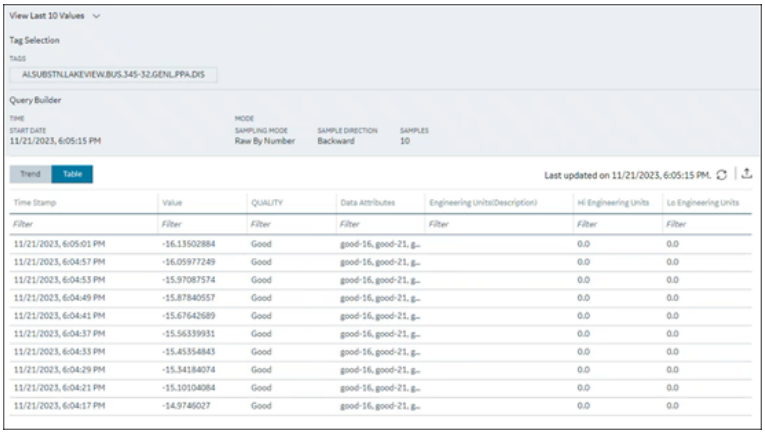
Create a Data Attribute Enumerated Set

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select , and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.

4. Select **New Set**, and enter values as described in the following table.
   The fields to create enumerated sets appear.

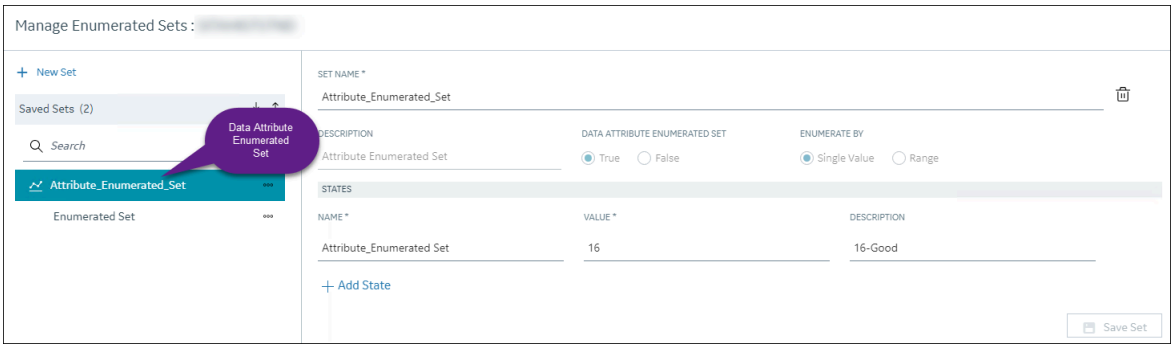


Field	Description
SET NAME	Enter a name for the set.
DESCRIPTION	Enter a description for the set.
DATA ATTRIBUTE ENUMERATED SET	Specify whether you want to define a custom text for the sub-quality status and view it in the **Attributes** column instead of the value when you retrieve the tag data. For example, if your tag is receiving bit positions indicating the sub-quality status (that are, 1 for Old data, 2 for Bad data, and 30 for Good data), you can map the bit position to a custom text and assign it to a set. So, when you view the actual values of the tag, the **Attributes** column will display the mapped custom text instead of the integer (the bit positions). For example, if you mapped a custom text name "good-16" to a value of 16, and the bit position of an incoming value is 16, it will display "good-16" in the **Attributes** column instead of 16. To create an attribute enumerated set, you must set **DATA ATTRIBUTES ENUMERATED SET** to **True**. If you choose this option, the **ENUMERATED BY** field is set to **Single Value** and becomes read-only. **Note:** It is not recommended to modify the created Data Attribute Enumerated set in Historian Administrator. If you modify it using Historian Administrator, the **DATA ATTRIBUTE ENUMERATED SET** field will be changed to **False** in Configuration Hub.

Field	Description
	Example- Before applying the Data Attribute Enumerated Set  Example- After applying the Data Attribute Enumerated Set 
ENUMERATE BY	Specify whether you want to define a single value or a range of values. For data attribute enumerated set, single value is selected by default and disabled.
NAME	Enter a name for the state.
VALUE	Enter a numeric value for the state; string values such as on/off are not supported. This field appears only if you select **Single Value** in the **ENUMERATE BY** field.
DESCRIPTION (under **STATES**)	Enter a description for the state.

5. For each state that you want to create, select **Add State**, and repeat the previous steps.

6. Select **Save Set**.
7. If needed, add more sets, and then select **Done**.
   The data attribute enumerated set is created.



Assign a Data Attribute Enumerated Set to a Tag

- Create the tag *(on page 1077)* for which you want to use an enumerated set.
- Create a data attribute enumerated set that you want to assign to a tag.

If you assign a data attribute enumerated set to a tag, when you retrieve the tag data, the corresponding custom text that was mapped appears.

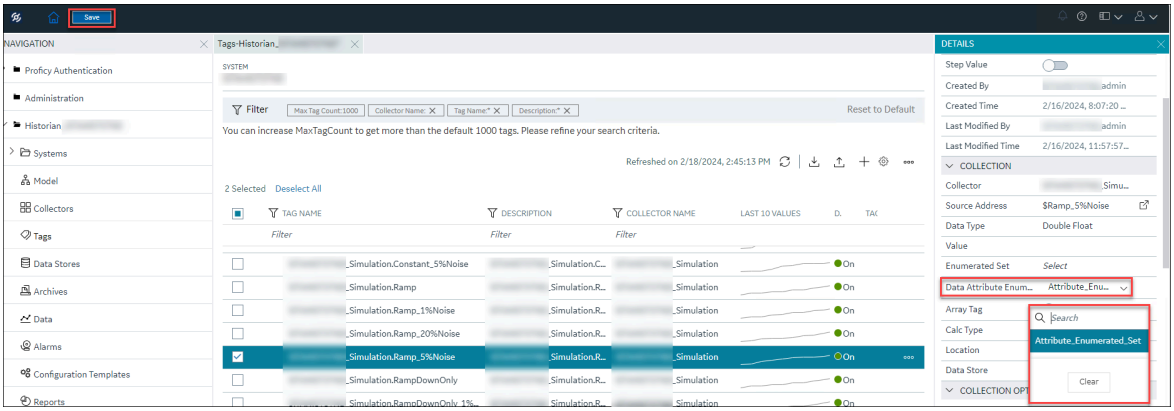
Example of a Data Attribute Enumerated Set

Suppose you have created the following states in a data attribute enumerated set:

State Name	State Value
Old	1
Bad	2
Good	30

Suppose you assign the data attribute enumerated set to a tag. If the tag's quality status are, say, 30, 30, 1, and 2, when you retrieve the tag values, Good, Good, Old, and Bad, respectively, are retrieved instead of the actual quality status values in the **Attributes** column.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select the tag to which you want to assign an enumerated set.
   The details of the tag appear in the **DETAILS** section.
4. Under **Collection**, select **Data Attribute Enumerated Set**.



5. In the upper-left corner of the page, select **Save**.
   The selected data attribute enumerated set is assigned to the tag.

Export Data Attribute Enumerated Sets

This topics describes how to export data attribute enumerated sets as a CSV file. You can export data attribute enumerated sets from Configuration Hub as a CSV file add/modify sets in bulk and then import them. You can also import the CSV file that was exported using Excel Add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select ⋯, and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.
4. In **Saved Sets**, select ⬆.
5. Enter a name for the file and save it in a location as needed.

Import Data Attribute Enumerated Sets

This topic describes how to import data attribute enumerated sets into Configuration Hub from a CSV file. You can either export data attribute enumerated sets and their details as a CSV file and edit them, and then import them back, or you can import data attribute enumerated sets and their details from another CSV file that you created externally, like Excel Add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select ⋯, and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.

4. In **Saved Sets**, select  .
   The **Import Saved Sets** page appears.
5. Select **Choose File**, and then select the CSV file as need.

> **Note:**
> If you import any irrelevant CSV file, the import will fail and you will be notified.

6. Select **Import**.
   The data attribute enumerated sets and their details are imported.
7. In the **Manage Enumerated Sets: <system name>**, select **Done**.

Rename a Data Attribute Enumerated Set

You can rename a data attribute enumerated set if needed.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select , and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.
4. Select the data attribute enumerated set that you need to rename.
   Details corresponding to the selected data set are displayed.
5. In **SET NAME**, rename the name of the set.
6. Select **Save Set**.
   The set name is updated.
7. Click **Done**.
   The changes are saved.

Delete a Data Attribute Enumerated Set

This topic describes how to delete a data attribute enumerated set.

> **Note:**
> You cannot delete a data attribute enumerated set if it is assigned to a tag.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select , and then select **Manage Enumerated Sets**.
   The **Manage Enumerated Sets: <system name>** window appears.

4. Select the data attribute enumerated set that you want to delete, or select ⋯, and then select **Delete Set**. Or, select 🗑 next to the Set name.
   A message appears, asking you to confirm that you want to delete the set.
5. Select **Delete**.
   The data attribute enumerated set is deleted.

Managing User-Defined Data Types

About User-Defined Data Types

Sometimes, a single tag cannot store all the required details of a parameter. For example, if you want to store the name, address, and phone number of the manufacturer of a machine, it may not be feasible to store all these details in a single tag, which uses a single data type. In such cases, you can create a user-defined data type (UDT), which includes one or more fields, and then apply that type to Historian tags. Each of these fields in a UDT can contain a different data type based on your requirement.

The following conditions apply when working with a UDT:

- You must have appropriate security permissions to create, modify, and delete a UDT. The type can have its own Administrator security group.
- You cannot create an array tag that uses a UDT.
- UDTs cannot have fields of Scaled or FixedString data types.
- Scaling, collector compression, and archive compression do not apply to UDT tags.
- You cannot associate an enumerated set with a UDT tag.
- A UDT supports maximum 100 fields.

Create User-Defined Data Types

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select ⋯, and then select **Manage User-Defined Types**.
   The **Manage User-Defined Types: <system name>** window appears.
4. Select **New Type**, and enter values as described in the following table.

Field	Description
TYPE NAME	Enter a name for the user-defined data type (UDT).
DESCRIPTION	Enter a description for the UDT.

Field	Description
ADMINISTER GROUP	Specify the Windows Security Group that you want to assign to the UDT.
DATA QUALITY	Select one of the following options: ◦ **Store Individual Quality**: Select this option to store field-level quality. Storing individual qualities consumes more disk space. ◦ **Store Master Field Quality**: Select this option if you want to assign the same quality as the master field to all the other fields in the UDT. If you select this option, the data sample will have a single quality similar to how an array tag works.
MASTER	Select the radio button corresponding to the field that you want to set as master. When you do so, the data type of this field is used for all the remaining fields in the UDT as well. Only one field can be the master in a UDT. The **MASTER** column appears only if you select **Store Master Field Quality** under **DATA QUALITY**.
NAME	Enter a name for the field.
DESCRIPTION (under **FIELD**)	Enter a description for the field.
DATA TYPE	Select the data type for the field. If you select **Store Master Field** under **DATA QUALITY**, and if you set this field as master, the data type of this field will be applied to the remaining fields in the UDT as well.

5. For each field that you want to create, select **Add Field**, and provide the required details.
6. Select **Save Type**.
7. If needed, add more UDTs, and then select **Done**.
   The UDT is created.

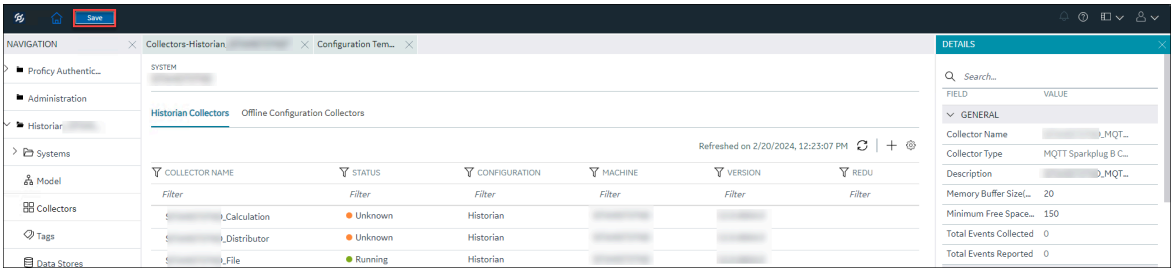
Assign the UDT to a tag *(on page 1439)*.

Assign a User-Defined Data Type to a Tag

- Create the tag *(on page 1077)* for which you want to assign a user-defined data type (UDT).
- Create the UDT *(on page 1438)* that you want to assign to the tag.

When you assign a UDT to a tag, the tag can collect data of various data types.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select the tag for which you want to assign a UDT.
   The details of the tag appear in the **DETAILS** section.
4. Under **Collection**, in the **User Defined Type Name** field, select the UDT that you want to assign.
5. In the upper-left corner of the page, select **Save**.



   The UDT is assigned to the tag.

Export User-defined Types

This topics describes how to export user-defined types as a CSV file. You can add/modify them in bulk, and then import them. You can also import the CSV file that was exported using Excel Add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select , and then select **Manage User-Defined Types**.
   The **Manage User-Defined Types: <system name>** window appears.
4. In **Saved Types**, select .
5. Enter a name for the file and save it in a location as needed.

Import User-defined Types

This topic describes how to import user-defined types into Configuration Hub from a CSV file. You can either export user-defined types and their details as a CSV file and edit them, and then import them back, or you can import user-defined types and their details from another CSV file that you created externally, like excel add-in.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.

3. Select , and then select **Manage User-Defined Types**.
   The **Manage User-Defined Types: <system name>** window appears.
4. In **Saved Types**, select .
   The **Import Saved Types** window appears.
5. Select **Choose File**, and then select the CSV file as need.

   Note:
   If you import any irrelevant CSV file, the import will fail and you will be notified.

6. Select **Import**.
   The user-defined types and their details are imported.
7. In the **Manage User-Defined Types: <system name>**, select **Done**.

Rename User-defined Types

You can rename a user-defined type as needed.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select , and then select **Manage User-Defined Types**.
   The **Manage User-Defined Types: <system name>** window appears.
4. In **Saved Types**, select the saved type as needed.
   Details corresponding to the selected user-defined type are displayed.
5. Change the user-defined type name as needed.
6. Select **Save Type**.
   The user-defined type name is renamed.
7. Click **Done**.
   The changes are saved.

Delete a User-Defined Data Type

You cannot delete a user-defined data type (UDT) if it is assigned to a tag.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Tags**.
3. Select , and then select **Manage User-Defined Types**.
   The **Manage User-Defined Types: <system name>** window appears.

4. Select the UDT that you want to delete, select ⋯, and then select **Delete**. Or, select 🗑 next to the UDT name.
   A message appears, asking you to confirm that you want to delete the UDT.
5. Select **Delete**.
   The UDT is deleted.

Managing Archives

About Archives

Historian archives are data files, each of which contains data gathered from all data sources during a specific period of time.

Types of Archive Files:

- ***machine name*_Config.ihc:** Contains information about the archiver, tag configuration, and collector configuration.
- ***machine name*_ArchiveXXX.iha:** Contains tag data, where x is a number indicating the place of the file in a time-based sequence.

Creation of Archive Files Automatically

Archive files grow to a user-configured maximum size as data is recorded by the server. When data starts loading into an archive file, Historian will automatically create a new blank archive file. When the current archive file becomes full, Historian will immediately serve data to the newly created archive file. This significantly reduces archive creation and transition time.

If, however, the option to automatically create archive files is not enabled, you must create an archive file manually *(on page)*.

Note:
If the option to automatically create an archive is not enabled and you do not create a new archive manually, or if the available disk space is less than the required amount of free disk space, a new archive file will not be created.

Overriding Old Archive Files

If you enable the **Overwrite Old Archives** option, the system replaces the oldest archived data with new data when the latest archive default size has been reached. Since this action deletes historical data,

exercise caution in using this feature. Be sure that you have a backup of the archive so that you can restore it later. Best practice is to create an additional archive to prevent premature loss of data due to overwriting. For example, if you want to save 12 months of data into 12 archives, create 13 archives.

During archiver startup and every 60 seconds while the server is running, Historian verifies that you have configured enough free disk space to save the archives, buffer files, and log files. If there is insufficient disk space, the Data Archiver shuts down and a message is logged into the log file. By default, you can view the Historian archiver log file in `C:\Historian Data\LogFiles`.

```
[03/03/10 15:28:41.398] Insufficient space available in [d:\Historian\Archives\]
        [03/03/10 15:28:41.399] The server requires a minimum of [5000 MB] to continue
        [03/03/10 15:28:41.679] USER: DataArchiver TOPIC: ServiceControl MSG: DataArchiver(DataArchiver)
        Archiver shutdown at 03/03/10 15:28:41.653
        [03/03/10 15:28:41.807] DataArchiver Service Stopped.
        [03/03/10 15:28:41.809] [d:\Historian\LogFiles\DataArchiver-34.log] Closed.
```

Guidelines for Setting Archive Size

Since archived data files can become quite large, you must adjust system parameters carefully to limit data collection to meaningful data only and thus minimize the required size of system storage. You can allocate up to 256 GB per archive.

For each archive, you need approximately 1MB of archive space for every 1000 tags to store tag information. Archive size is a function of the rate at which you archive data and the time period you want the archive to cover. A typical user wants the archive to cover a time period of, say, 30 days.

The following factors affect the rate at which you archive data:

- Number of tags
- Polling frequency of each tag
- Compression settings
- Data types

Based on these parameters, the archive size is calculated as follows:

$$\#Tags \times \frac{Values}{Tag} \times \frac{Tags}{Second} \times \%PassComp \times \frac{Bytes}{Value} \times \frac{Seconds}{Hour} \times \frac{Hours}{Day} \times \frac{MB}{Bytes} = \frac{MB}{Day}$$

Calculating Archive Size

Suppose you want to store data, and you have the following parameters:

- Number of tags: 5000
- Polling rate: 1 value/5 seconds
- Pass compression: 5%.

  Pass compression is the number of data values archived relative to the number of values read.

- Bytes/value: 4
- Duration: 30 days

Based on the preceding formula, for the given parameters, the archive size is calculated as follows:

$$5000 \times \frac{1}{1} \times \frac{1}{5} \times \frac{5}{100} \times \frac{4}{1} \times \frac{3600}{1} \times \frac{24}{1} \times \frac{1}{1024 \times 1024} \times 30 = 494 \frac{MB}{Month}$$

The calculation shows that a file size of 500 MB is adequate for archiving one month of data for this application.

Therefore, we recommend that you set the default archive size to 500 MB for systems with 1000 tags or more. If you believe the computed size is too large for your application, you can modify parameters as follows:

- Decrease the polling frequency.
- Increase compression deadband, reducing the pass percentage.
- Reduce the number of tags.
- Add more disk capacity to your computer.

Archive Size Calculator

An archive size calculator tool is available to estimate archive size and collector compression based on a tag that has already been configured or based on your inputs. Log on to http://digitalsupport.ge.com to download this tool and other GE Intelligent Platforms freeware product solutions.

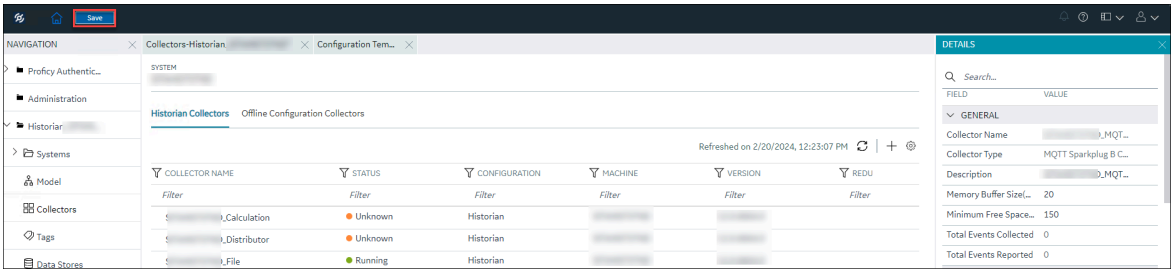
Access an Archive

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Archives**. The **Archives** section appears. By default, only the archives of the default data store appear. If you want to access archives from another data store, select it in the **DATA STORE** field.

3. Select the archive whose details you want to access.
   The **DETAILS** section displays the following information of the archive.

Field	Description
Status	Identifies the status of the archive. Contains one of the following values: ◦ **Current**: The archive is actively accepting data. ◦ **Active**: The archive contains data but is not currently accepting data. ◦ **Empty**: The archive was created but has never accepted data.
Start Time	The time at which writing data to the archive has begun.
End Time	The time at which writing data to the archive has ended.
Last Backup	The time at which the archive has been backed up last.
Backup User	The user who created the last backup of the archive.
File Name	The name and folder path of the archive file.
File Size (MB)	The size of the archive file.
File Attribute	Indicates whether the archive file is read-only or read/write.

4. If needed, change the values in the **Filename** and **File Attribute** fields. You cannot, however, change the file attribute for the current archive.
5. In the upper-left corner of the page, select **Save**.



The archive is modified.

Create Archives Automatically

Historian can automatically create archives for you if the current archive reaches a specific size or after a specific duration. This topic describes how to set these options. You can, however, choose to create archives manually *(on page 1447)*.

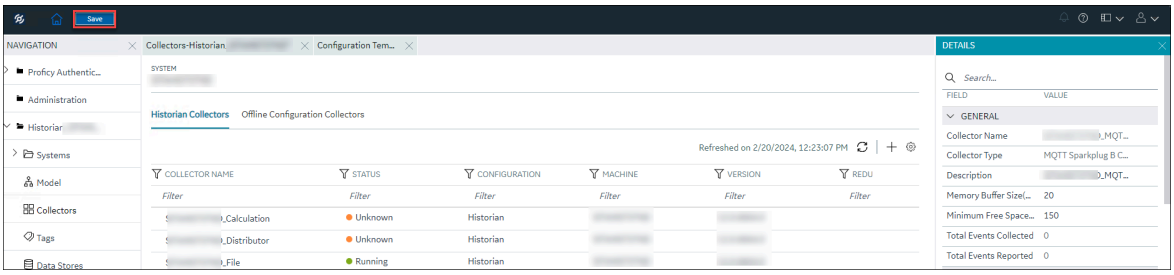
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Archives**.
   The **Data Stores** section appears.
3. Select the data store in which you want to create archives automatically.
   The **DETAILS** section displays the details of the data store.
4. Under **Archive Creation**, enter values as described in the following table.

Field	Description
Automatically Create Archives	Switch the toggle on to indicate that you want Historian to create archive files automatically when the current one is full.
Create Archive By	Select whether you want to create a new archive automatically after the current one reaches a specific *size* or after a specific *duration*. This field is enabled only if you switch the **Automatically Create Archives** toggle on. Select one of the following options: ◦ **Size**: Select this option if you want to create a new archive when the current one reaches a specific size. Specify the size in the **Default Size (MB)** field (which appears only if you select **Size**). ◦ **Days** or **Hours**: Select one of these options if you want to create a new archive after a specific duration. Specify the duration in the **Archive Duration** field (which appears only if you select **Days** or **Hours**).
Default Size (MB)	The default size of an archive after which a new one will be automatically created. This field

Field	Description
	appears only if you select **Size** in the **Create Archive By** field.
Archive Duration	The duration after which a new archive will be automatically created. This field appears only if you select **Days** or **Hours** in the **Create Archive By** field.

If needed, you can switch the **Overwrite Old Archives** toggle on. If you enable this option, the oldest archived data is replaced with the latest one when the latest archive default size is reached. Since this action deletes historical data, exercise caution in using this feature. Be sure that you have a backup of the archive so that you can restore it later. Best practice is to create an additional archive to prevent premature loss of data due to overwriting. For example, if you want to save 12 months of data into 12 archives, create 13 archives.

5. In the upper-left corner of the page, select **Save**.



Archives will now be created automatically based on the criteria you specified.

Create Archives Manually

This topic describes how to create an archive file manually. You can create multiple archives at the same time. You can, however, choose to create archives automatically *(on page 1446)*.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Archives**.
   The **Archives** section appears.
3. In the upper-right corner of the section, select +.
   The **Add Archives** window appears.
4. Enter values as described in the following table.

Field	Description
ARCHIVE NAME	Identifies the name of the archive. A value is required. By default, it is in the following format: *<data store name>_<system name>_*-Archive*<number>*. The number is used to name the archives sequentially. You can only add a suffix to the archive name.
DATA STORE	Select the data store in which you want to create the archives. A value is required.
FILE LOCATION	Enter the folder path in which you want to store the archives. A value is required. By default, it is `C:\Proficy Historian Data\Archives`
EACH ARCHIVE SIZE	Enter the size, in MB, that you want to allocate to each archive. A value is required. This field is populated with the value in the **Default Size (MB)** field in the data store (if applicable).
NUMBER OF ARCHIVES	Enter the number of archives that you want to create. A value is required. The default value is 1.
ALLOCATE SPACE	Specify the disk space that you want to allocate for archives. A value is required. **Important:** If there is insufficient disk space, Data Archiver is shut down and a message is logged into the log file. By default, you can view the log file in `C:\Historian Data\LogFiles`.

5. Select **Add**.
   The archives are created.

Back up an Archive

Ensure you have enough disk space.

You must back up archive files periodically to ensure that your data is protected. These backup files contain tag data as well as alarms and events data. You can send these files to a shared network location or to physical media.

Always back up archives before a planned Historian software product upgrade. Use Microsoft® Volume Shadow Copy Service when backing up archive files that are more than 2 GB in size or when backing up more than the last two archives. For more information, refer to Back Up Archives with Volume Shadow Copy Service *(on page 1450)*.

This topic describes how to back up an archive manually. You can also back up an archive automatically *(on page)*.

Important points to remember:

- The .IHC file is automatically backed up when, and only when, you back up the current archive .IHA file. By default, the .IHC backup path is the same as the archives path.
- The .IHC backup file uses the following naming convention: `<system name>_Config-Backup.ihc`. If the default backup path is different from the archives counterpart, the .IHC file is copied to the backup folder with the standard .IHC naming convention: `ComputerName_Config.ihc`.
- In the mirroring system, Client Manager sends a backup message to Data Archiver located on the Client Manager node to which you are connected. The back up, then, happens in the specified location on that node. If that Data Archiver is not running, a NOT_CONNECTED error message appears, and the backup will not happen.
- If you back up an archive more than once, the backup tool will (by default) attempt to use the same name for the backup file and will detect that an archive with the same name already exists. Rename the backup archive file or move the original backup archive file to a different folder.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Archives**. The **Archives** section appears.
3. Right-click the archive that you want to back up (or select ⋯), and then select **Backup Archive**. The **Backup Archives** window appears. The **ARCHIVE NAME** field is disabled and populated. The **BACKUP FILE PATH** field is disabled and populated with the value in the **DEFAULT BACKUP PATH** field of the data store.

4. Select **OK**.
   The archive file is backed up.

Back up Archives with Volume Shadow Copy Service

Use the Microsoft® Volume Shadow Copy Service to back up large archive files, or if you want to back up more than the last two archives, as it allows you to backup and restore archives reliably and in a short period of time without affecting the data collection.

The Volume Shadow Copy feature is provided by Windows Operating System, and the instructions to use backup and restore vary depending on the backup application that is used in the Windows operating system.

VSS provides fast volume capture of the state of a disk which is called a snapshot or shadow copy. When the snapshot is taken, disk writes are suspended for a brief period of time, typically on the order of milliseconds. After the snapshot, disk writes can resume, but the original state of the files are maintained by a difference file. The difference file allows the state of the original file at the time of the snapshot to be reconstructed. This behavior allows files to be backed up while new data is being written to files.

If you are using `ihArchiveBackup.exe` before the upgrade, your backup will continue to work in the same or similar manner as it did before the upgrade. There is no change in the backup procedure and the Auto Recovery Backup Files option remains unchanged.

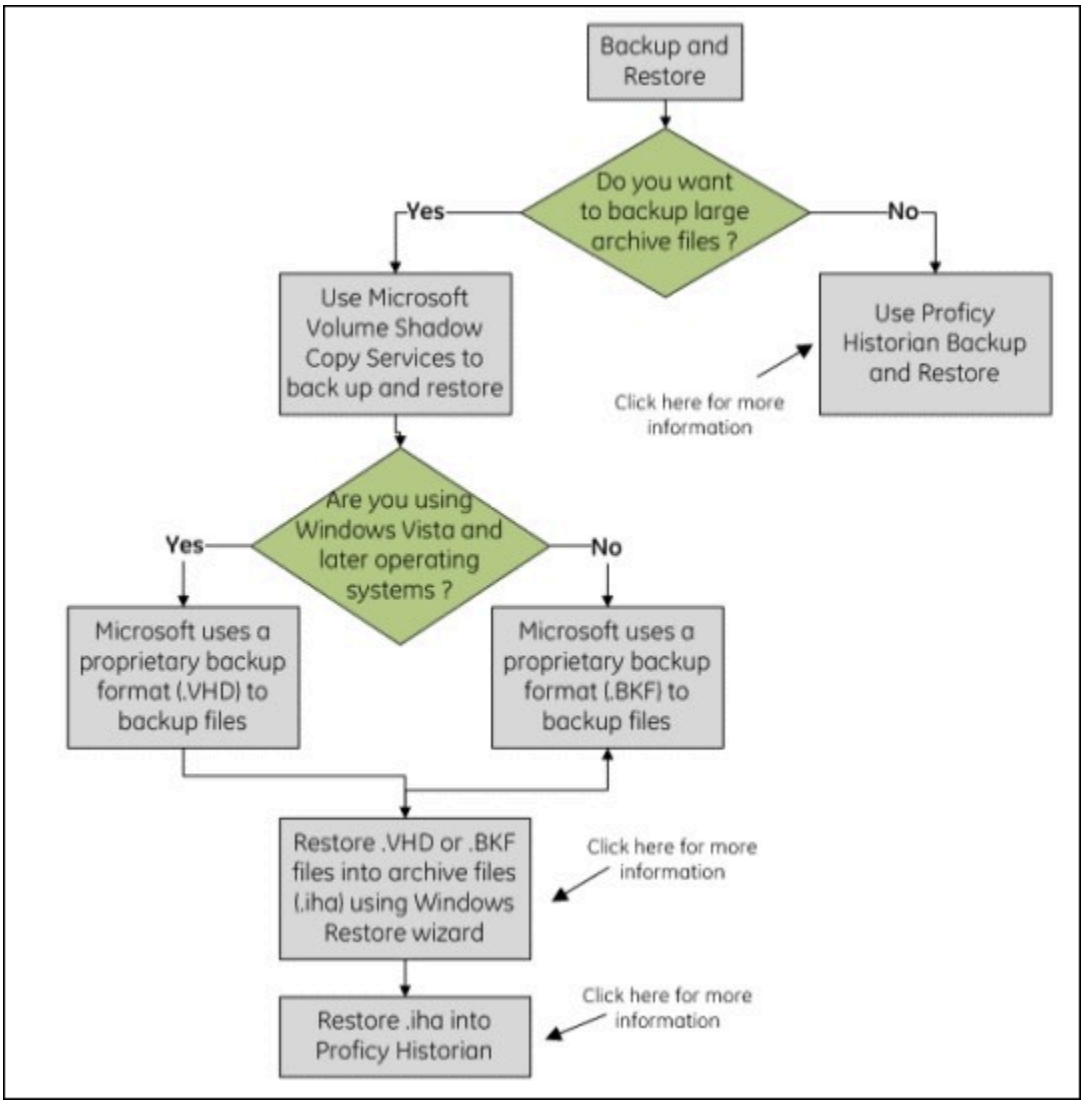
Note:
Though you could use either ihArchiveBackup.exe or VSS for backup, VSS is a better choice for both larger archives or if you are backing up more than the last two archives to reduce the load on the Data Archiver service.

Microsoft uses a backup format called Virtual Hard Disk (VHD) to back up files.

When you create archives backup using Microsoft® Volume Shadow Copy Service, you must first restore the archives files (that is, .bkf or .vhd into .iha) using the Windows Restore wizard, and then restore the archives (.iha) into Historian. For more information on restoring an archive (.iha) into Historian, refer to the Restoring an Archive topic.

Note:
It is recommended that you:

- Use Microsoft® Volume Shadow Copy Service when you want to back up archive files that are more than 2 GB in size, or if you are backing up more than your last two archives.
- Ensure you have enough hard drive space on your default backup location before backing up your archives.



Important:

For optimum performance, it is recommended you to save paging file of the operating system, Historian archives, and scheduled backup directory on separate drives.

Restore an Archive

- Before restoring an archive from a removable disk, copy the archive file to the normal archive path and then restore the archive from that location. Leave the original backup file in the backup file folder.
- Ensure that the current archive is online.

Under certain circumstances, you may want to restore tag and alarms and events data to Historian. This may be after an unplanned shutdown, or you may need to retrieve data from an old, inactive archive.

Important:
Restoring an archive is a resource-intensive operation and should be scheduled for non-peak usage times.

Archives that have been previously removed from Historian can be found in the `\Archives\Offline` directory.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Archives**.
   The **Archives** section appears.
3. In the upper-right corner of the section, select  .
   The **Restore Archives** window appears.
4. Enter values as described in the following table.

Field	Description
FILE LOCATION	This field is populated with the value in the **DEFAULT BACKUP PATH** field of the data store. Append the name of the .zip file of the archive that you want to restore. The **ARCHIVE NAME** field is populated with the .zip file name that you enter.
DATA STORE	Select the data store in which you want to restore the archive.

5. Select **Restore**.
   The archive is restored; it is moved to the `Archive` folder and is made available for querying.

Close an Archive

By default, an archive is closed when it is full. However, you can manually close an archive before it is full.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Archives**.
   The **Archives** section appears.
3. Right-click the archive that you want to back up (or select ⋯), and then select **Close Archive**.
   A message appears, asking you to confirm that you want to close the archive.
4. Select **Yes**.
   The archive file is closed, and another one is used for writing data.

Remove an Archive

When you remove an archive, it no longer appears in Configuration Hub. However, it exists in the Archives folder (by default, `C:\Proficy Historian Data\Archives`).

You cannot remove the current archive. If you want to remove it, you must first close it. When you do so, another archive is used for writing data.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Archives**.
   The **Archives** section appears.
3. Right-click the archive that you want to remove (or select ⋯), and then select **Remove Archive**.
   A message appears, asking you to confirm that you want to remove the archive.
4. Select **Yes**.
   The archive file is removed.

Reading/Writing Data

Query Data

Using Configuration Hub, you can query the data of selected tags. This data is then plotted in a trend chart. You can also export this data into a PDF, SVG, PNG, or a JPEG file, or save it as favorites.

Querying data involves the following steps:

1. **Selecting the tags:** You can select tags from all the tags in the system. While selecting tags, you can view them in a hierarchical object model view or in a flat list.
2. **Applying conditions and filters:** You can select the sampling mode, size, query modifiers, and so on. You can also select the calculation modes for the calculated sampling mode.
3. **Generating the report:** You can plot the query results in a trend chart or view them in a table. You can also export the data.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data**.
   The **Data** section appears, displaying a list of object instances and the underlying variables and contained types hierarchically. If you want to view a flat list of all the tags, select  .
3. Select the tags for which you want to query data, select Read data operation, and then select **Next**. You can select up to 10 tags.
4. Enter values as described in the following table.

Field	Description
START DATE/TIME	Enter the start date and time for the query.
END DATE/TIME	Enter the end date and time for the query.
SAMPLING MODES	Select the sampling mode for the query: ◦ **Calculated** *(on page)*: Returns the result of a calculation on tag values (for example, count, maximum, delta). ◦ **Current Value** *(on page)*: Returns a single sample containing the current value of the tag. Retrieves the timestamp, value, and quality. ◦ **Interpolated** *(on page)*: Returns the interpolated tag values. ◦ **Interpolated to Raw** ◦ **Lab** *(on page)*: Returns only collected values. Each collected value is repeated until the next collected value, resulting in a jagged step plot instead of a smooth curve. ◦ **Lab to Raw** ◦ **Raw By Number** *(on page)*: Returns the specified number of raw samples of all qualities beginning with the start time and moving in the specified direction.

Field	Description
	◦ **Raw By Time** *(on page)*: Returns all raw samples of all qualities with a timestamp greater than the start time and less than or equal to the end time. It will not return a raw sample with same time stamp as the start time. ◦ **Trend** *(on page)*: Returns significant points, which are raw samples. These points are determined by finding the raw minimum and raw maximum values within each interval. ◦ **Trend to Raw** ◦ **Trend to Raw2** ◦ **Trend2** *(on page)*: Splits up a given time period into a number of intervals (using either a specified number of samples or specified interval length), and returns the minimum and maximum data values that occur within the range of each interval, together with the timestamps of the raw values. This sampling mode is suitable for analysis of minimum and maximum values and for plotting programs that can handle unevenly spaced data.
CALCULATION MODE	Select the calculation mode that you want to use. This field appears only if you select **Calculated** in the **SAMPLING MODES** field. For information on calculation modes, refer to Calculation Modes *(on page)*.
SAMPLING DIRECTION	The direction in which you want to retrieve the query results: ◦ **Forward**: Returns query results starting from the start data to the end date. ◦ **Backward**: Returns query results starting from the end date to the start data.
SAMPLE INCREMENT	Identifies the amount of data samples in each sample: ◦ **By Size**: Select this option if you want each sample to contain a specific number of data points, and then enter the number of data points. ◦ **By Time**: Select this option if you want each sample to contain data points collected for a specified duration, and then enter the duration.

Field	Description
QUERY MODIFIERS	Used for retrieving a specific set of data. For information, refer to Query Modifiers *(on page)*.
Filters	You can enter your filter conditions using the Filter tag, the Filter Condition, and the Filter Comparison Value. In the Filter Tag Name field, select the tag you want to enable filtering with. In the Condition field, select your comparison condition. In the Value field, enter your filter condition value.

5. Select **Generate Report**.

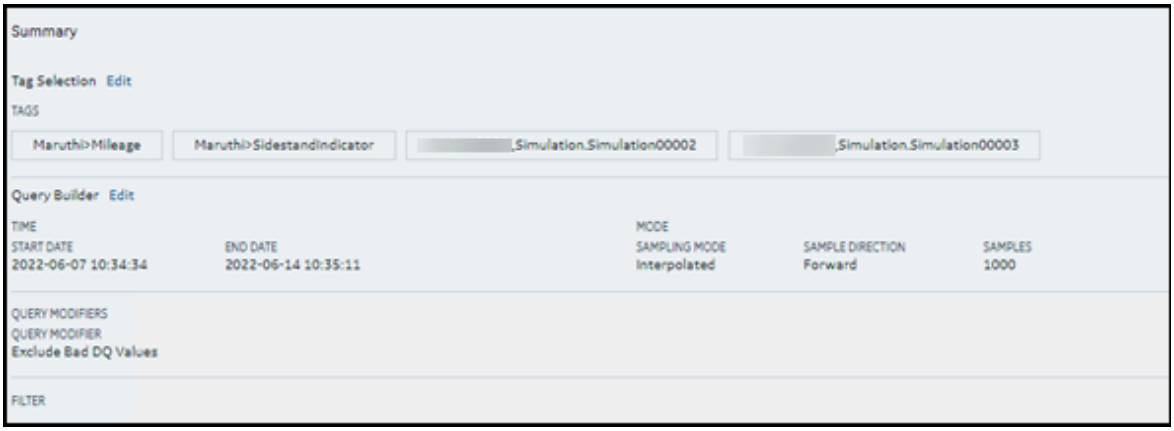
   The query results for the selected tags are plotted on a trend chart.

You can narrow down the start and end dates by dragging the timeline below the trend chart.

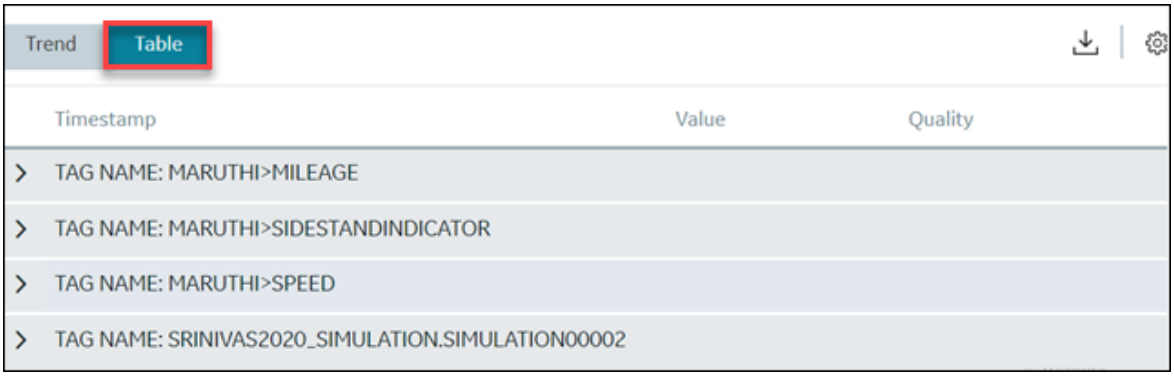
Query_Results.mp4

The Tags and query criteria appear in the **Summary** section; you can edit them if needed.

Select the Edit beside Tag Selection and Query Builder to modify tags and query criteria.



If you want to view the results in a table, select **Table**.



You can save the query if you may frequently use to read specific tags data with a specific query criteria. For more information, refer to Save a query *(on page 1460)*.

If you want to export the results into a .csv file, select CSV. The results are exported.

If you want to print the trend, select ☰, and then select **Print**.

To export into other formats (such as a .pdf, .svg, .png, or .jpeg), select ☰, and then select the format.

Write Data

Using Configuration Hub, you can write data for selected tags. This helps you verify that data is being sent to Data Archiver.

Writing data involves the following steps:

1. **Selecting the tags:** You can select tags from all the tags in the system. While selecting tags, you can view them in a hierarchical object model view or in a flat list.
2. **Entering the data:** You can enter data for each selected tag, along with the data type and quality.
3. **Generating the report:** You can plot the query results in a trend chart or view them in a table. You can also export the data.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data**.
   The **Data** section appears, displaying a list of object instances and the underlying variables and contained types hierarchically. If you want to view a flat list of all the tags, select  .
3. Under **DATA OPERATION**, select **Write Data**.
4. Select the tags for which you want to write data, and then select **Next**.
5. For each tag that you have selected, enter values as described in the following table.

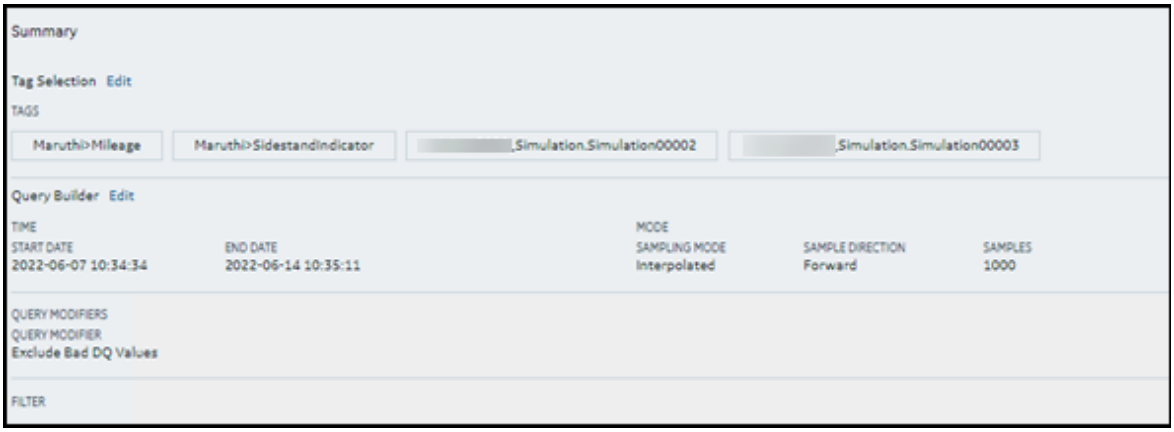
Column	Description
VALUE	Enter the value of the tag. A value is required.
DATA TYPE	If Hierarchical tags are selected, select the data type of the tag value. A value is required. If normal tags are selected, the data type will be automatically populated.
DATA QUALITY	Select the data quality of the tag value from Good or Bad from the list. A value is required.

6. Select **Write Data**, and then select **Next**.
7. Select **Generate Report**.
   The query results for the selected tags are plotted on a trend chart.

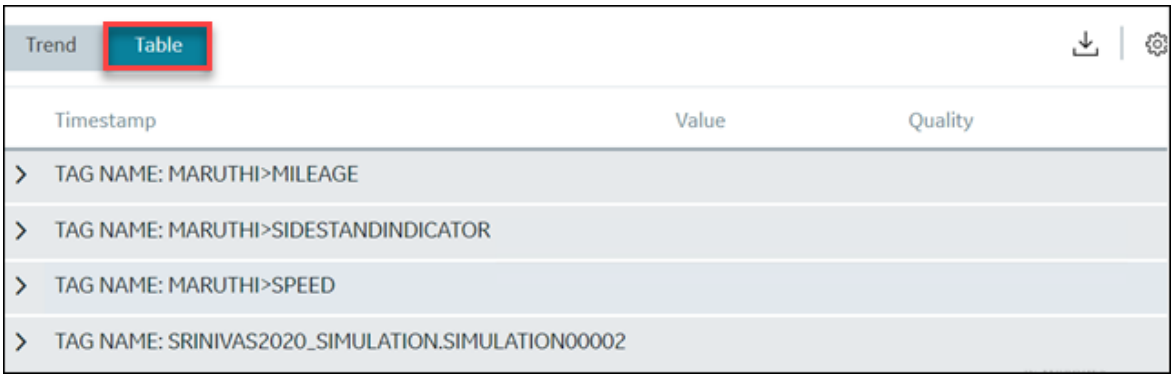
You can narrow down the start and end dates by dragging the timeline below the trend chart.

Query_Results.mp4

The query criteria appear in the **Summary** section; you can edit them if needed.



If you want to view the results in a table, select **Table**.



About Saved Query

About Saved Query

You can save queries that you use to read tags data. You can use this option to save queries that you may frequently use to read specific tags data with a specific query criteria. This will help you in the following:

- Quickly gather insights of specific tags.
- Create and save a predefined query only once and use it as needed.
- You can use the **Shared** option to make the query visible to the other users in the same network.

> **Note:**
> Once you share a query, all the other users will also be able to edit, and delete it. Be mindful about making a query as a shared query.

- Automate a monotonous query process through the saved queries.

What to do Next: You can Save a query *(on page 1460)*.

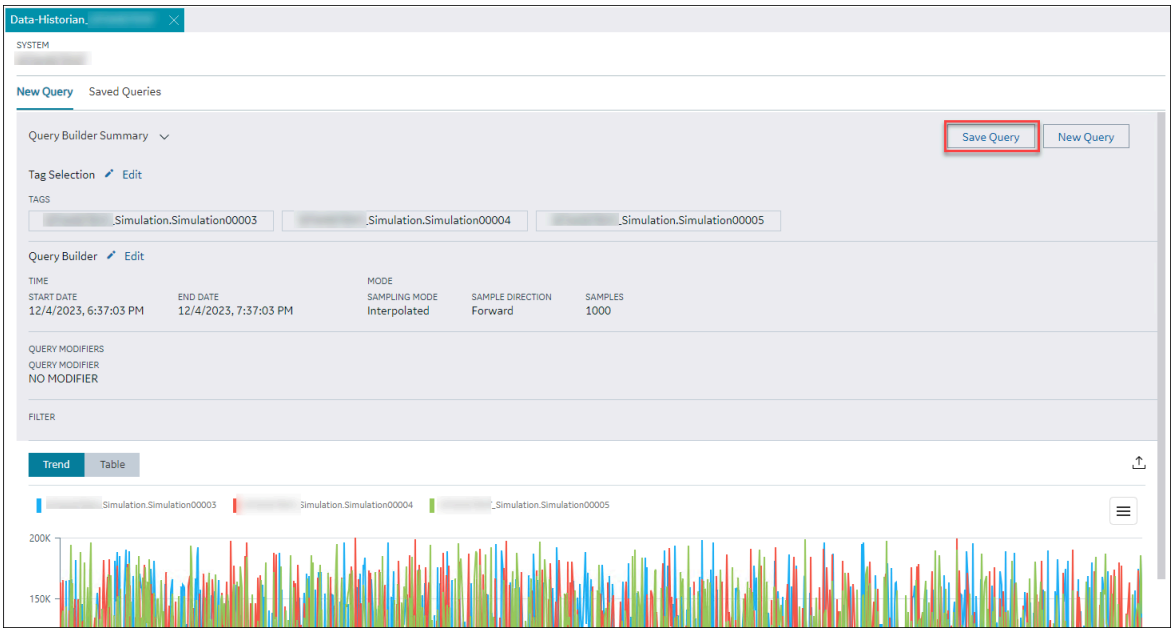
Save a Query

This topic describes how to save a Query to read tags data.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data**.
   The **Data** section appears, displaying a list of object instances and the underlying variables and contained types hierarchically. If you want to view a flat list of all the tags, select .

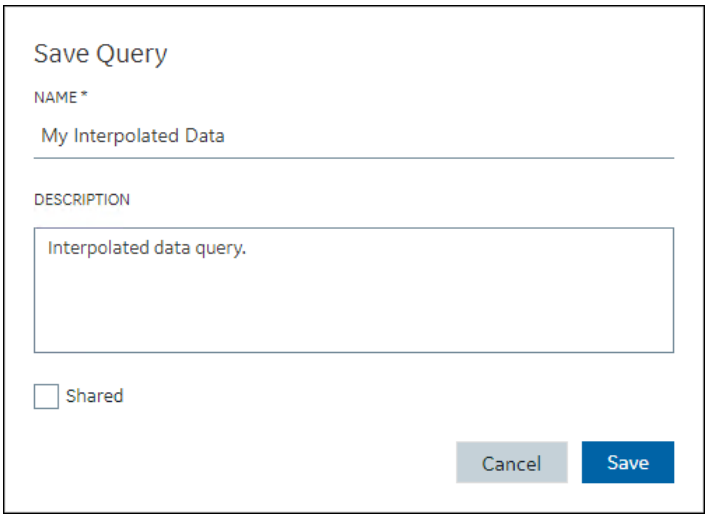
3. Select the tags for which you want to query data, select **Read Data** operation, and then select **Next**.
4. Enter the values as needed. For more information on the values, refer to Query Data *(on page 1457)*.
5. Select **Generate Report**.

   The query results are plotted on a trend chart.



6. Select **Save Query**.

   The **Save Query** window appears.



7. Enter values as described in the following table.

Field	Description
NAME	Enter a meaningful name for your query. You can enter alphanumeric values and also use special characters.
DESCRIPTION	This is optional. You can enter a description about the query you are creating. The description can help other users to get a quick overview of what this query is about.
Shared	Select this check box to share this query with others. **Note:** Once you share a query, all the other users will also be able to edit, and delete it. Be mindful about making a query as a shared query.

8. Select **Save**.
   The query is saved.
9. Select the **Saved Queries** tab.
   The query you saved will be listed.

You can run or edit *(on page 1463)* the query.

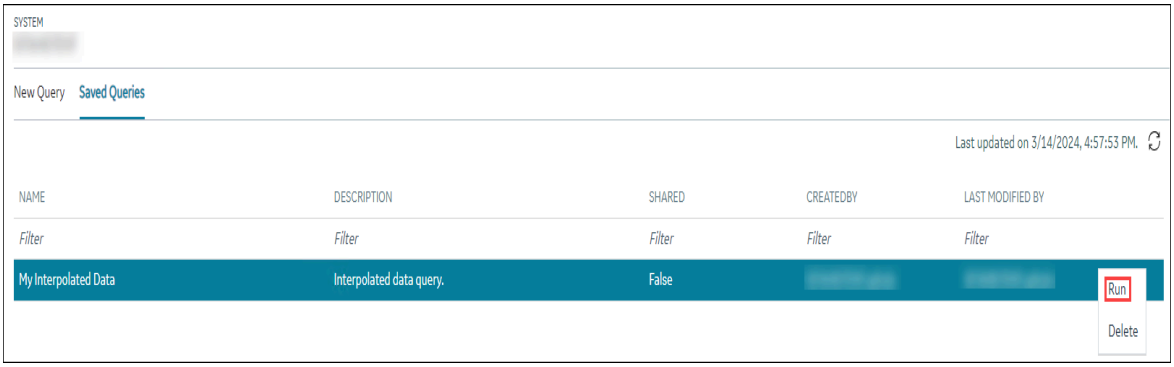
Run a Saved Query

After you create and save a query, you can run the query and see the query results.

This topic describes how to run a saved query.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data**.
   The **Data** section appears, displaying a list of object instances and the underlying variables and contained types hierarchically.
3. Select the **Saved Queries** tab.
   The list of all the saved queries appears.
4. Select a query as needed.

5. Select , and then select **Run**.



The query results are plotted on a trend chart.

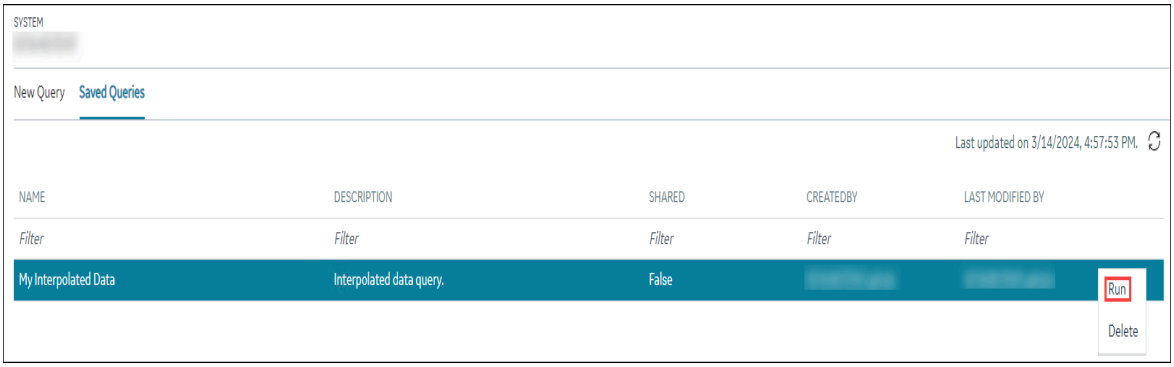
Update a Saved Query

There can be changes in a process and so in the values. To update your saved queries, you can use the update option.

This topic describes how to edit and update a saved query.

Note:
If you are accessing a shared query, and if you did not create it, be mindful before you edit it. If possible, avoid editing the query.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data**.
   The **Data** section appears, displaying a list of object instances and the underlying variables and contained types hierarchically.
3. Select the **Saved Queries** tab.
   The list of all the saved queries appears.
4. Select a query as needed.
5. Select , and then select **Run**.



The query results are plotted on a trend chart.

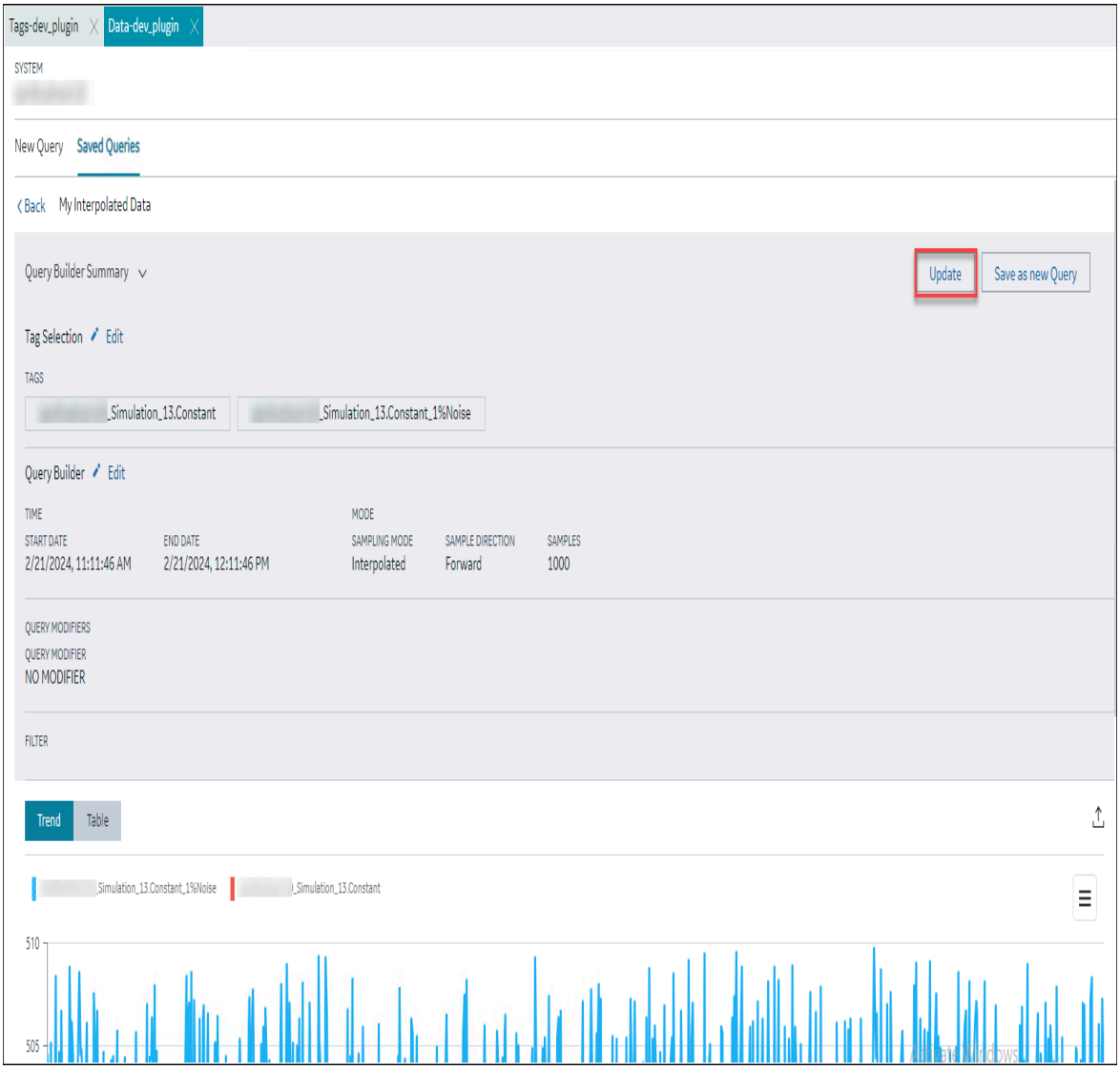
6. Select the **Edit** beside **Tag Selection** and **Query Builder** to edit tags and query criteria.

    a. Edit the tag selections or query criteria as needed.

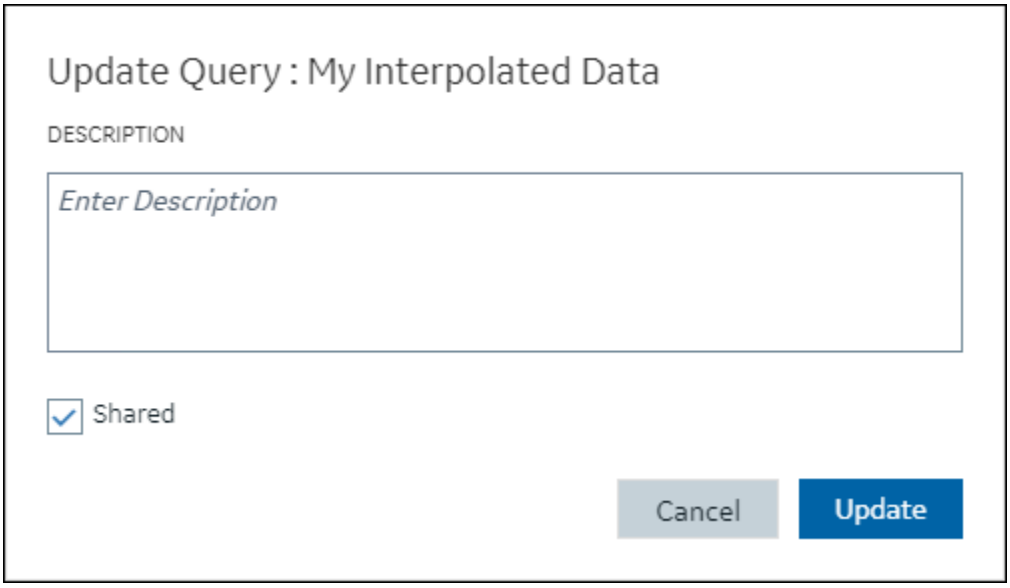
    b. Select**Generate Report**.

    The **Query Builder Summary** appears.

7. Select **Update**.



The **Update Query:<Query Name>** window appears.

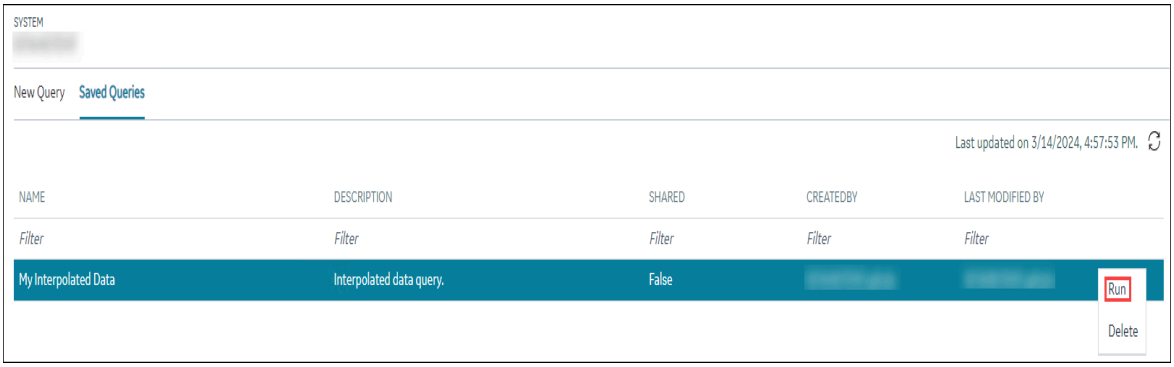


8. Update the description if needed
9. Select **Update**.
   The query is updated.
10. To go back to the saved queries tab, in the top-left corner, select **<Back**

Update a Saved Query and Save it as a New Query

This topic describes how to update a saved query and save it as a new query.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data**.
   The **Data** section appears, displaying a list of object instances and the underlying variables and contained types hierarchically.
3. Select the **Saved Queries** tab.
   The list of all the saved queries appears.
4. Select a query as needed.
5. Select  , and then select **Run**.



The query results are plotted on a trend chart.

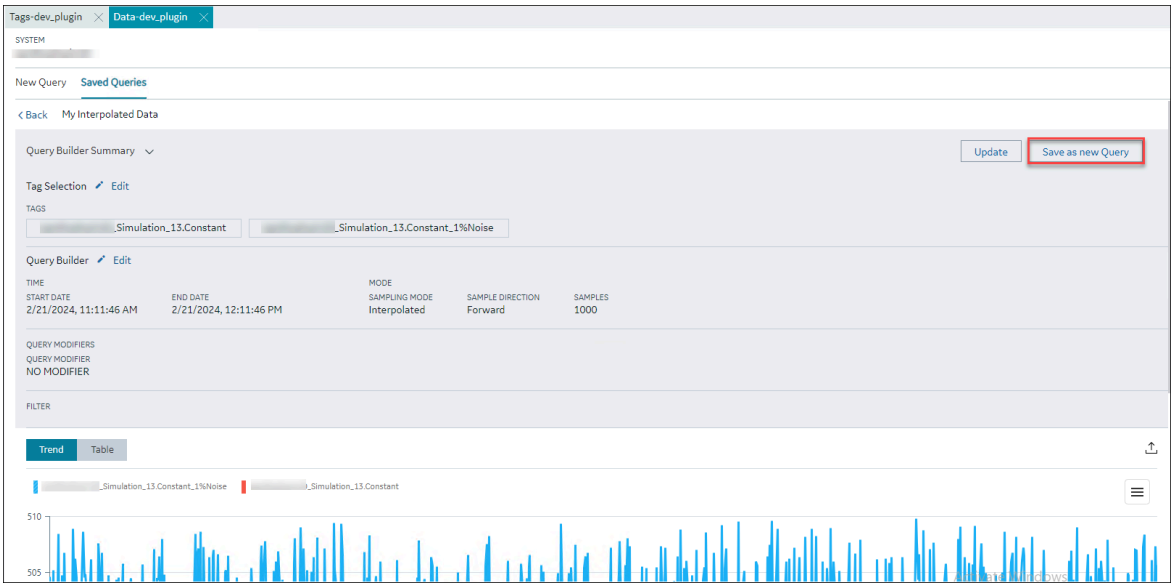
6. Select the **Edit** beside **Tag Selection** and **Query Builder** to edit tags and query criteria.

    a. Edit the tag selections or query criteria as needed.

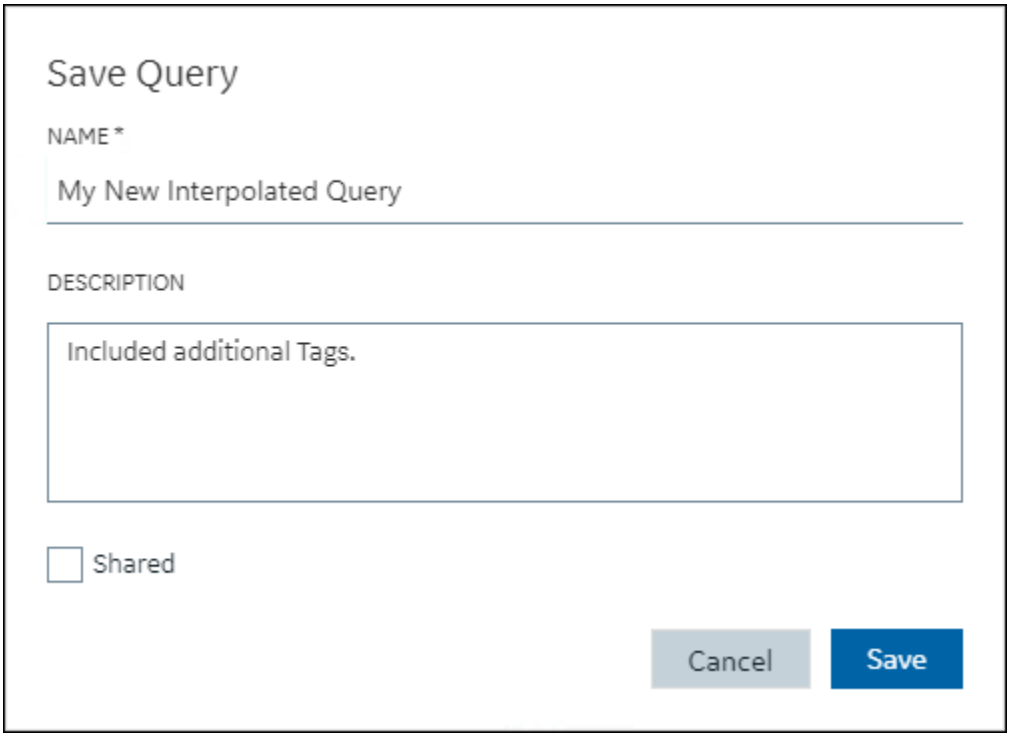
    b. Select**Generate Report**.

    The **Query Builder Summary** appears.

7. Select **Save as new Query**.



The **Save Query** window appears.



8. Enter a new name and description for the query.
9. Select **Save**.
   The updated query is saves as a new query.
10. To go back to the saved queries tab, in the top-left corner, select **<Back**

Delete a Saved Query

This topic describes how to delete a saved query.

Note:
If you are accessing a shared query, and if you did not create it, be mindful before you delete it. Instead, kindly try to create a new query as needed.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data**.
   The **Data** section appears, displaying a list of object instances and the underlying variables and contained types hierarchically.
3. Select the **Saved Queries** tab.
   The list of all the saved queries appears.
4. Select a query as needed.

5. Select  , and then select **Delete**.
   The **Delete Query** window appears, prompting you whether to delete the saved query or not.
6. Select **Yes**.
   The saved query is deleted.

Managing Alarms and Events

About Alarms and Events

Using Configuration Hub, you can manage alarms and events data from any OPC-compliant alarms and events server.

> **Note:**
> The Alarm Archiver must be available and running to access this feature.

Alarms: Alarms are generally defined as tags going into an abnormal condition. For example, you can set an alarm on a boiler when it reaches a specified temperature. Alarms usually have a well-defined life cycle, which is defined by the individual data sources from which the alarms data is collected. They enter an alarm state, are generally acknowledged, then return to normal.

To collect alarms and events data, you can use any of the following collectors:

- iFIX Alarms and Events collector
- OPC Classic Alarms and Events collector

Historian handles alarm data in two ways. You can view the entire Alarm as a single record that contains all information about the alarm, or you can view the Alarm History, which shows the transitions of the alarm as individual records.

Events: Events are generally defined as activities in a system that occur once only. For example, a user logging on to a device is an event. When viewing this data in Historian, each event is returned as a record.

Alarms and Events Requirements

To generate alarms and events data, you can use any OPC-compliant alarms and events server such as:

- CIMPLICITY
- iFIX

To collect alarms and events data, install collectors *(on page)*, and then add any of the following collector instances:

- iFIX Alarms and Events collector *(on page 1224)*
- OPC Classic Alarms and Events collector *(on page 1251)*

To store alarms and events data, install Historian Alarms and Events *(on page)*. During the installation, provide the credentials of Microsoft SQL server 2012 or later.

To view and analyze alarms and events data, you can use any of the following applications:

- Configuration Hub
- Historian Administrator
- Crystal Reports 11 or later
- The OLEDB Provider
- REST APIs

Note:
Before starting the Alarm Archive service, ensure that "`NT AUTHORITY/SYSTEM`" has "`SysAdmin`" privileges.

Create an Alarm

This topic describes how to create an alarm manually. You can use it to verify that Historian is collecting alarm data. You can then use the iFIX Alarms and Events collector or the OPC Classic Alarms and Events collector to collect alarm data and store it in Historian.

1. Access Configuration Hub *(on page 1055)*
2. In the **NAVIGATION** section, under the Configuration Hub for Historian, select **Alarms**.
   The **Alarms** section appears.
3. In the upper-right corner of the page, select ooo.

   Note:
   To select hierarchical model tags you must need to have the valid license.

   The **Add Alarm** window appears, displaying a list of tags in a hierarchical view. If you want to view a flat list of all the tags, select  .

4. Select the check boxes corresponding to the tags for which you want to create an alarm, and then select **Next**.
   The **Alarm Attributes** section appears, displaying the selected tags. The **TAG NAME** and **TIMESTAMP** columns are automatically populated.
5. For each tag, enter values as described in the following table.

Column	Description
SEVERITY	Specify whether you want to record high or low severity for the alarm.
DATA QUALITY	Specify whether you want to record good or bad quality for the alarm.
MESSAGE	Enter a message for the alarm.

6. Select **Write Alarm**.
   The alarm is created.

Access/Filter Alarms

1. Access Configuration Hub *(on page 1055)*
2. In the **NAVIGATION** section, under the Configuration Hub for Historian, select **Alarms**.
   The **Alarms** section appears.
3. To filter for alarms, enter values as described in the following table.

Field	Description
GENERATED FROM	Enter the start date and time for which you want to filter alarms. By default, ten minutes earlier than the current time is considered. A value is required.
GENERATED TO	Enter the end date and time for which you want to filter alarms. By default, the current time is considered. A value is required.
COLLETOR NAME	Select the collector that collects the alarms and events data.

4. Select **Apply**.

The alarms and events data is filtered based on the criteria. To access the events data, select **Events**. The list of events is also filtered based on the criteria.

> **Tip:**
> You can show/hide/reorder columns in the table. For instructions, refer to Common Tasks in Configuration Hub *(on page 1072)*.

Back up Alarms Using Configuration Hub

1. Access Configuration Hub *(on page 1055)*
2. In the **NAVIGATION** section, under the Configuration Hub for Historian, select **Alarms**.
   The **Alarms** section appears.
3. Select ⋯, and then select **Backup Alarms**.
   The **Backup Alarms** window appears.
4. Enter values as described in the following table.

Field	Description
GENERATED FROM	Enter the start time for which you want to back up alarms.
GENERATED TO	Enter the end time for which you want to back up alarms.
PROVIDE FILE NAME	Enter the file name and location of the back up file that you want to create. By default, the backup location of the default data store is considered. And, the file name is in the following format: `mm_dd_yyyy_hh_mm_ss`. For example: 11_25_2022_11_23_26.zip. The time format followed is the 24-hour time notation. **Note:** This file naming convention for alarm backup is standard to Historian. Even if you use other date settings such as `dd-mm`, the file name will still be saved in the mm-dd format. The end time stamp in the file name indicates the time at which the alarms have been backed up but not the time till when the alarms are backed up. For example, suppose, at 8.00 am, you back up alarms for the past two hours, the backup will contain alarms from 6:00 am to 8:00 am but may not contain an alarm

Field	Description
	generated at 8:00 am. The last alarm may have been at 7:50 am. But the backup file name will have the time stamp of 8:00:00 along with the date.

5. Select **Backup**.
   The alarms data is backed up.

Restore Alarms Using Configuration Hub

Restoring alarms to a running system makes them available for query and analysis. You can restore alarms that have been backed up or deleted previously.

1. Access Configuration Hub *(on page 1055)*
2. In the **NAVIGATION** section, under the Configuration Hub for Historian, select **Alarms**.
   The **Alarms** section appears.
3. Select , and then select **Restore Alarms**.
   The **Restore Alarms** window appears.
4. In the **PROVIDE FILE NAME** field, provide the backup file in the .zip format that you want to restore.

   Note:
   Remember to include .zip at the end of the file name.

5. Select **Restore**.
   The alarm data is restored.

About Purging Alarms

Purging alarm data involves deleting the data from the database.

Note:

- Even after purging, the data is not lost; a backup is created to maintain an audit trail. You can restore the data if needed.
- When using circular archives (that is, archives that roll over), alarms are purged automatically.

You can choose to purge alarm data for any of the following reasons:

- To maintain alarm data efficiently
- The data is outdated or redundant
- The disk space is limited

Data in the following tables is purged:

- Alarm Attribute Values
- Alarm Attribute Value History
- Delete from Alarm History
- Delete from Alarm Table esignatures
- comments

You can purge data using one of the following methods:

- Purge data within a specified duration. You can do this using Configuration Hub *(on page 1475)*, using the Proficy Historian Alarm and Event Data Migration utility *(on page)* or at a command prompt *(on page)*.
- Purge data related to a specific alarm ID. You can do this using `Alarms.PurgeAlarmsById` *(on page)* to develop an SDK program.

Purging is performed in batches. You can check the log data in the `Proficy.Historian.AandE.Migration.log` file. By default, this file is located in the `C:\Program Files(x86)\Proficy` folder.

In the case of a failure:

- The batch size is changed to 10. That is, the collector receives an acknowledgement after sending 10 messages, thus reducing the load on the server.
- The waiting time for receiving an acknowledgement is automatically incremented after each failure per batch, starting from 90 seconds to 270 seconds. This gives more time for the server to respond.

Note:
After the acknowledgement is received, the batch size and the waiting time are reset for the subsequent batches.

If the time taken to purge exceeds the timeout limit, instead of reverting the entire purging operation, only the current batch, which is still under processing, is purged.

Best Practices:

- Restart the Alarms and Events services before purging data.

Purge Alarms Using Configuration Hub

1. Access Configuration Hub *(on page 1055)*
2. In the **NAVIGATION** section, under the Configuration Hub for Historian, select **Alarms**.
   The **Alarms** section appears.
3. Select ⋯, and then select **Purge Alarms**.
   The **Purge Alarms** window appears.
4. In the **PROVIDE FILE NAME** field, pro
5. Enter values as described in the following table.

Field	Description
GENERATED FROM	Enter the start time for which you want to purge alarms.
GENERATED TO	Enter the end time for which you want to purge alarms.
PROVIDE FILE NAME	Enter the file name and location of the back up file that you want to create. This field is enabled only if you select the **BACKUP ALARMS BEFORE PURGE?** check box. By default, the backup location of the default data store is considered. And, the file name is in the following format: `mm_dd_yyyy_hh_mm_ss`. For example: 11_25_2022_11_23_26.zip. The time format followed is the 24-hour time notation. **Note:** This file naming convention for alarm backup is standard to Historian. Even if you use other date settings such as `dd-mm`, the file name will still be saved in the mm-dd format. The end time stamp in the file name indicates the time at which the alarms have been backed up but not the time till when the alarms are backed up. For example, suppose, at 8.00 am, you

Field	Description
	back up alarms for the past two hours, the backup will contain alarms from 6:00 am to 8:00 am but may not contain an alarm generated at 8:00 am. The last alarm may have been at 7:50 am. But the backup file name will have the time stamp of 8:00:00 along with the date.
BACKUP ALARMS BEFORE PURGE?	Select the check box if you want to back up alarms before purging.

6. Select **Purge**.
   The alarms data is purged. A backup file is created if you have selected the **BACKUP ALARMS BEFORE PURGE?** check box.

Managing Configuration Templates

About Configuration Templates

A configuration template is a predefined set of common configuration options. You can create a configuration template for data stores and collectors separately and apply it to data stores and collectors as needed. This will help you save time by eliminating the need to configure common parameters manually and reduce monotonous tasks.

Note:
You can apply a data store configuration template to a user-created data store, provided they are not set as the default data store.

The following are some of the advantages of creating a configuration template:

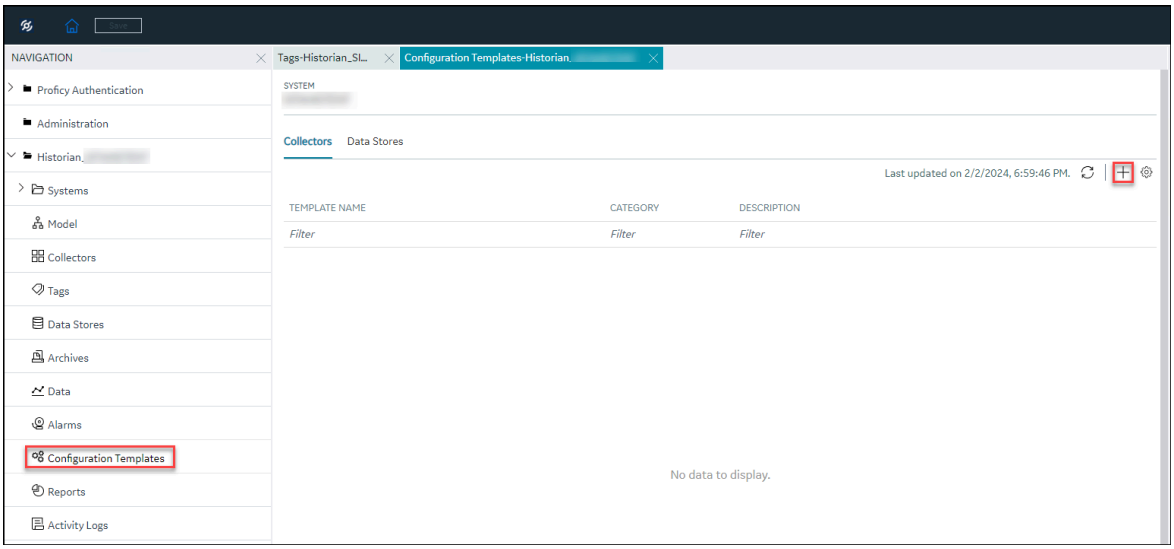
- Update some common configurations of a data store or collector.
- Save time from configuring common parameters.

Create a Configuration Template for Collectors

This topic describes how to create a configuration template for collectors.

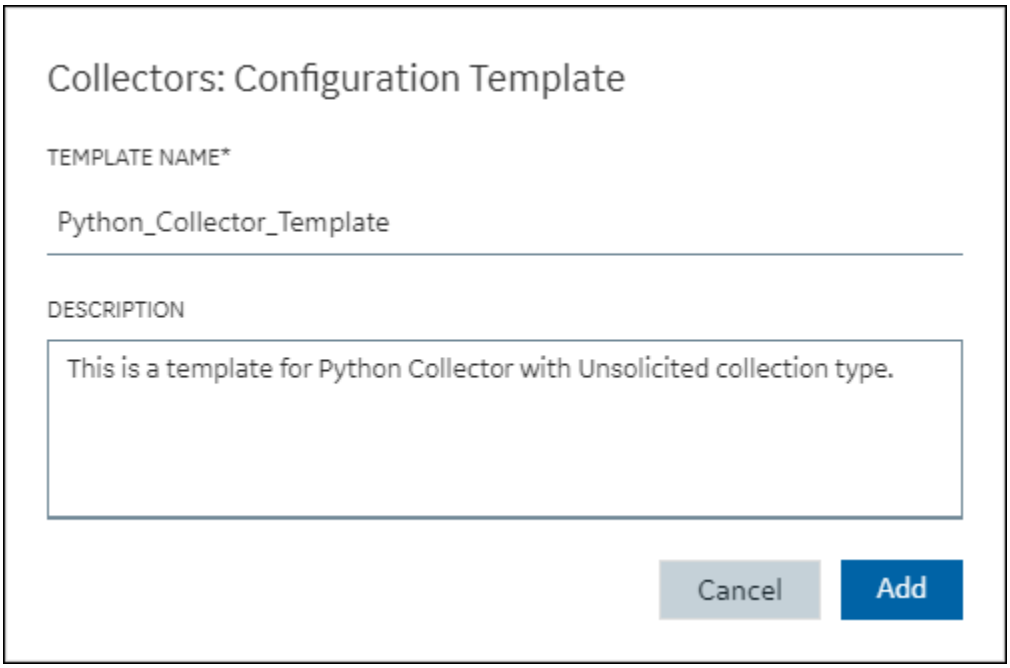
1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select**Configuration Templates**.

   The **Collectors** tab appears, providing you to option to create template.



3. Select +.

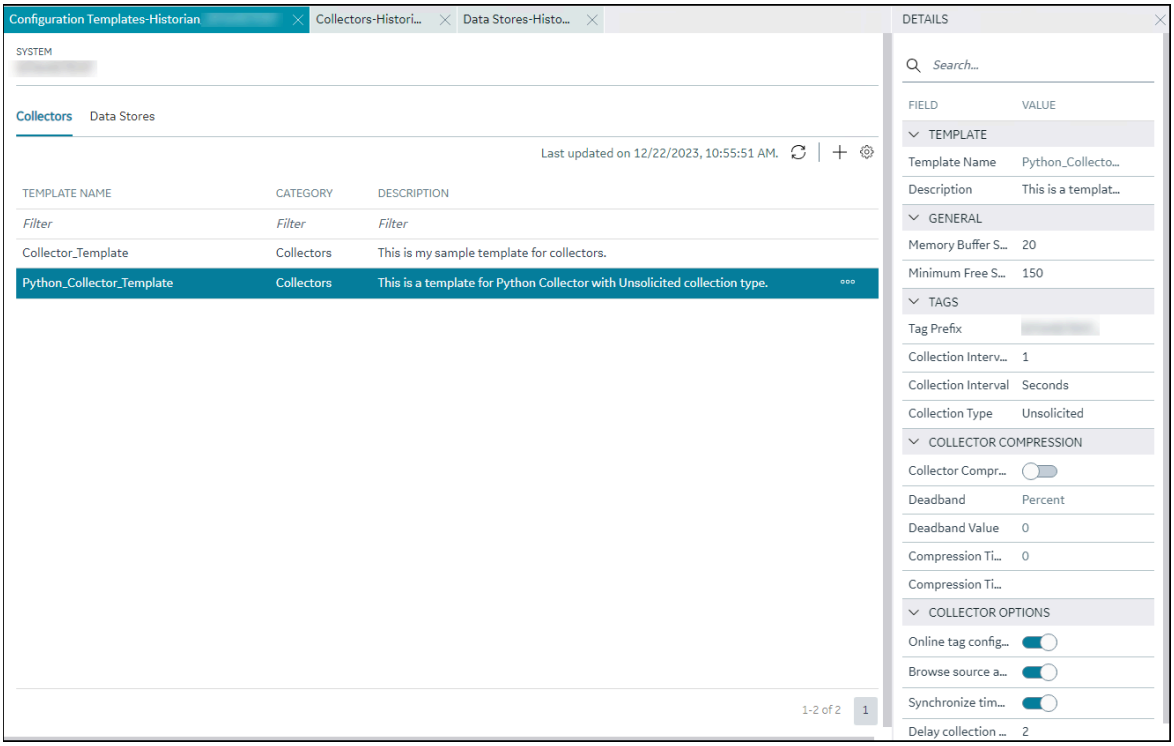
   The **Collectors:Configuration Template** window appears.



4. In **TEMPLATE NAME**, enter a name for the template. You can enter any alphanumeric names and also use special characters.
5. In **DESCRIPTION**, enter a description for your template.

6. Select **Add**.

   The configuration template is created.



7. Select the row that contains the created template.

   The configuration details appear in the **DETAILS** section.

Table 51. The Template Section

Field	Description
Template Name	The name of the template. This field is read-only.
Description	The description of the template. You can edit the description if needed.

Table 52. The General Section

Field	Description
Memory Buffer Size (MB)	The size of the memory buffer currently assigned to the store-and-forward function. The memory buffer stores data during short-term or momentary interruptions of the server connection; the disk buffer handles long duration

Field	Description
	outages. To estimate the size you need for this buffer, you need to know how fast the collector is trying to send data to the server and how long the server connection is likely to be down. With those values and a safety margin, you can compute the required size of the buffer. The default value is 20.
Minimum Free Space (MB)	The minimum free disk space that must be available on the computer. If the minimum space required is not available when the collector starts, the collector will shut down.

Table 53. The Tags section

Field	Description
Tag Prefix	The prefix that will be added to each tag that you configure for the collector instance. This field is disabled and populated with the name of the collector instance. This field applies to all collectors except File and Calculation collectors.
Collection Interval Value	The interval at which the collector collects data for all the tags configured in the collector instance. ◦ For polled data collection, this value represents the time required to complete a poll of tags in the collector. ◦ For unsolicited data collection, it represents the frequency at which data is retrieved from tags in the collector. The collection interval can be individually configured for each tag. You can set this value for each tag as well.

Field	Description
	Important: For an OPC collector, to avoid collecting redundant values when using device timestamps, specify a collection interval that is greater than the OPC server update rate.
Collection Interval	The units of measure for the collection interval value.
Collection Type	The type of the data collection: ◦ **Polled:** Data is collected based on a scheduled time interval. This type of data collection is supported only for: ▪ The Calculation collector ▪ The HAB collector ▪ The iFIX collector ▪ The OPC Classic DA collector ▪ The OPC UA DA collector ▪ The Python collector ▪ The Simulation collector ▪ The Windows Performance collector ◦ **Unsolicited:** Data is collected based on an event. This type of data collection is supported only for: ▪ The Calculation collector ▪ The HAB collector ▪ The MQTT collector ▪ The MQTT Sparkplug B collector ▪ The ODBC collector ▪ The OPC Classic DA collector ▪ The OPC Classic HDA collector ▪ The OPC UA DA collector ▪ The OSI PI collector ▪ The OSI PI distributor

Field	Description
	▪ The Python collector ▪ The Server-to-Server collector ▪ The Server-to-Server distributor ▪ The Wonderware Collector

Table 54. The Collector Compression Section

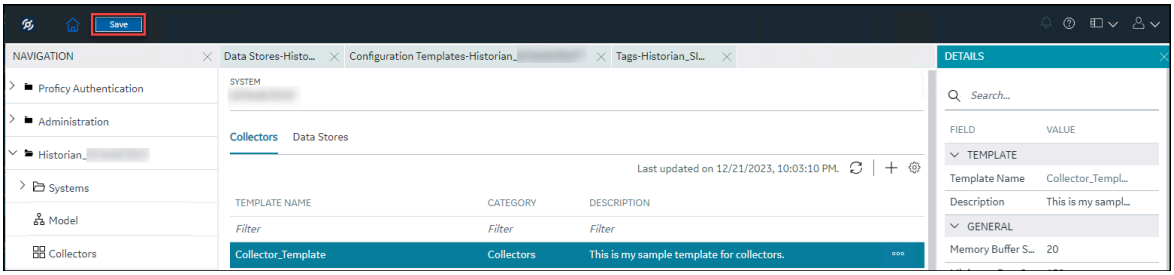
Field	Description
Collector Compression	Indicates whether you want to apply collector compression, which is a smoothing filter to data retrieved from the data source. By ignoring small changes in values that fall within a deadband centered around the last reported value, only significant changes are stored in Historian, thus consuming less archive storage space. For more information, refer to About Collector and Archive Compression *(on page 1379)*.
Deadband	Indicates whether you want to apply a deadband based on the percentage of values or on absolute values. For example, if you set the deadband to 20% for a range of 0 to 500 engineering units, the deadband value is 100 units, which is 50 units on each side. Therefore, only if the difference between two values is greater than 50, they are stored in Historian. **Note:** If the data quality changes from good to bad or vice versa, the values are stored in Historian regardless of the deadband value.
Deadband Value	The deadband value that you want to use for values collected by the collector. Depending on

Field	Description
	whether you have selected percent or absolute, the deadband value is determined. For example, if you want to set a deadband of 5 units on either side of a value (that is, value +/- 5), enter 10 in the **Deadband Value** field, and select **Absolute** in the **Deadband** field. Similarly, if you want to set a deadband of 5% on either side of a value, enter 10 in the **Deadband Value** field, and select **Percent** in the **Deadband** field. For more information, refer to About Collector and Archive Compression *(on page 1379)*.
Compression Timeout	The time for one poll cycle for which collector compression is not used, thus sending all the samples to Historian. This is used for a Calculation collector or Server-to-Server collector, when calculations fail, you may possibly observe collector compression (even if it is not enabled), thus producing no results or bad quality data. In such cases, you can use compression timeout, thus sending all the samples to Historian. For more information, refer to About Collector and Archive Compression *(on page 1379)*.
Compression Timeout Interval	The units of measure for compression timeout.

Table 55. The Collector Options Section

Field	Description
Online Tag Configuration Changes	Indicates whether you want tag configuration changes to reflect immediately. If you disable this option, any tag configuration changes will reflect only after you restart the collector instance.

Field	Description
Browse Source Address Space	Indicates whether you want to allow browsing for tags in the source. You may sometimes want to disable this option to reduce processing load on the collector.
Synchronize Timestamps to Server	Indicates whether you want to adjust the timestamp of data to align with the time setting in the Historian server. Note that this does not change the time setting in the collector machine; it only calculates the timestamp based on the difference between the time settings in the server machine and the collector machine, independent of time zone or daylight saving differences. **Note:** ◦ This option is applicable only if the timestamp of the collector is considered (instead of that of the data source - as specified in the **Time Assigned By** field). ◦ If this option is disabled, and if the time in the collector machine is more than 15 minutes ahead of the time in the server machine, data will not be stored in Historian.
Delay Collection at Startup (sec)	The duration, in seconds, after which you want the data collection to begin post tag configuration.



8. After you edit the details as needed, in the upper-left corner, select **Save**.
   The configuration details are saved.

   You can select ••• and duplicate this template, edit, or delete it.

You can apply the configuration template to a collector instance *(on page 1369)*.

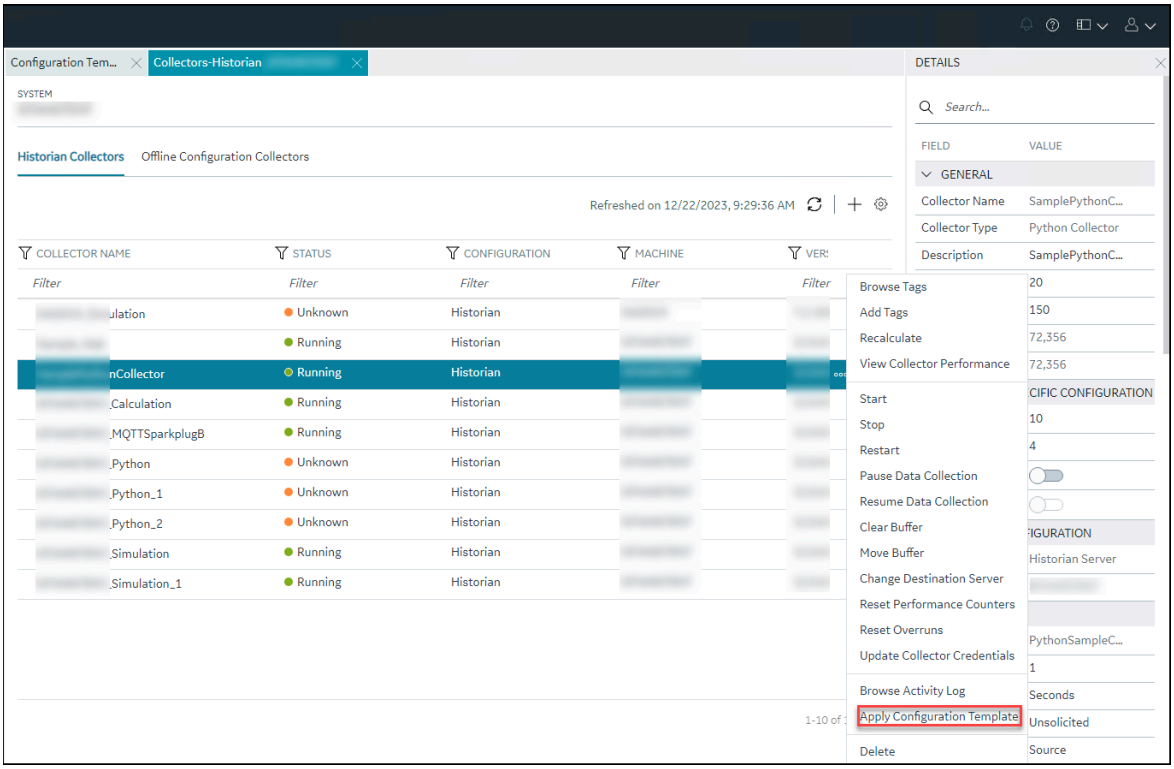
Apply Configuration Template to a Collector

You can apply the created template to collectors as needed. You will be prompted to confirm whether you want to overwrite few of the configuration values with the values in the template.

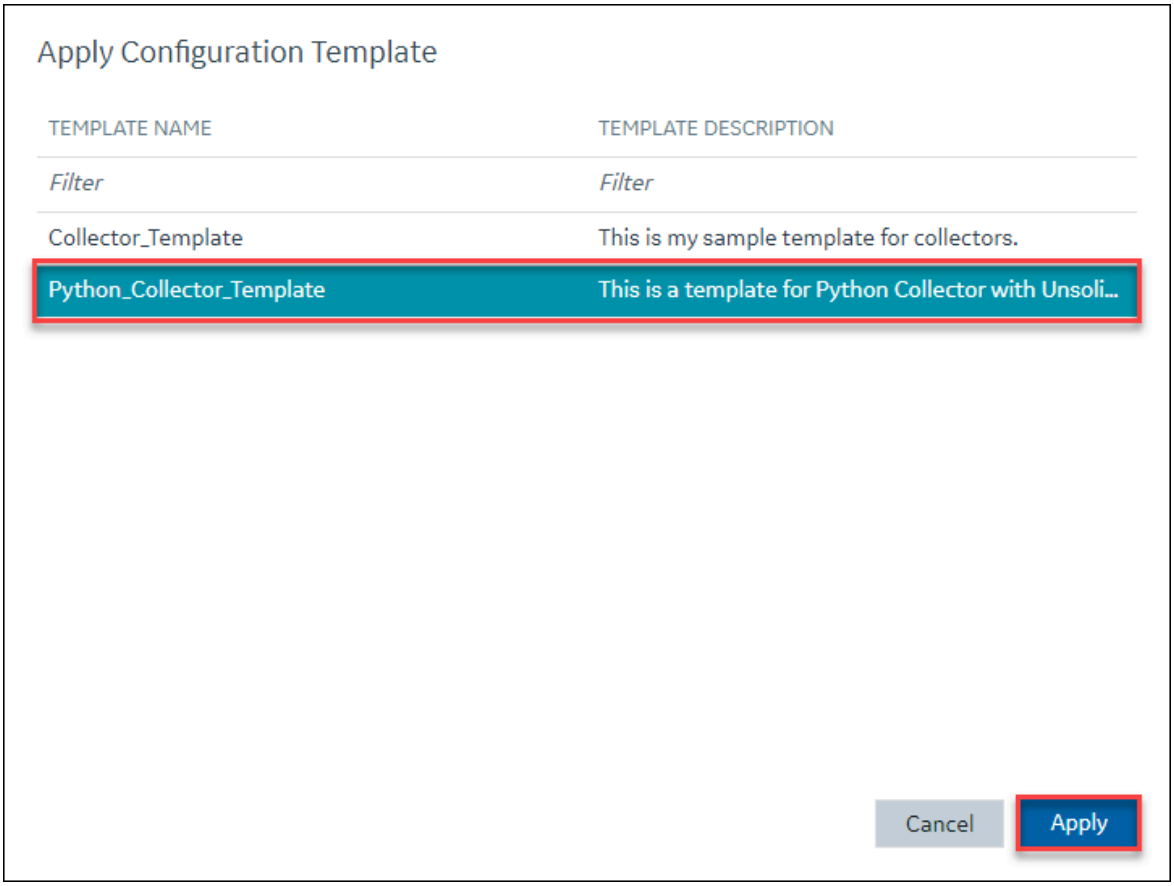
- Ensure that you have a collector instance added *(on page 1076)*.
- Ensure that you created a configuration template for collectors *(on page 1476)*.

This topic describes how to apply a configuration template to a collector.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors appears.
3. Right-click the collector (or select •••), and then select **Apply Configuration Template**.



The **Apply Configuration Template** window appears, listing the available templates.

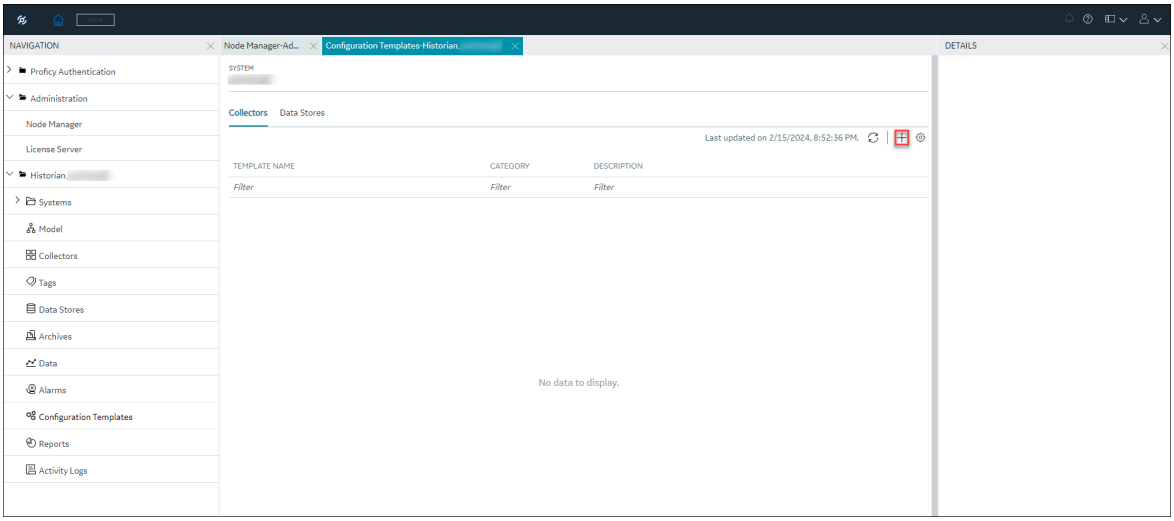


4. Select **Apply**.
   A confirmation window appears, prompting you to confirm whether you want to overwrite few of the configuration values with the values in the template.
5. Select **Ok**.
6. In the upper-left corner, select **Save**.
   The configurations in the template are applied to the collector.

Create a Configuration Template for Data Stores

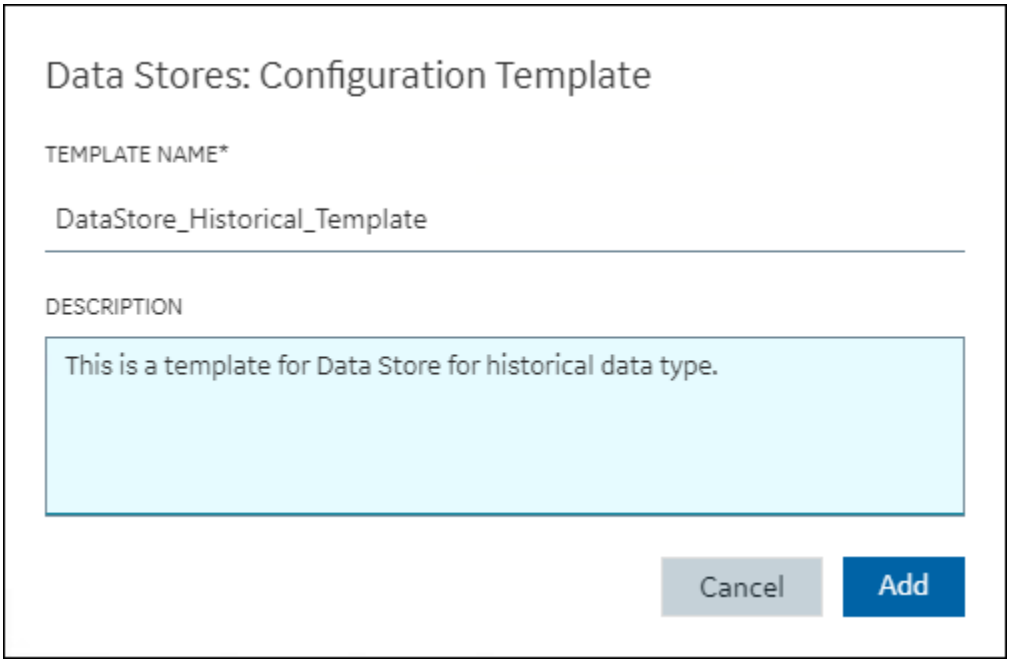
This topic describes how to create a configuration template for data stores.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Configuration Templates**.
3. Select the **Data Stores** tab.



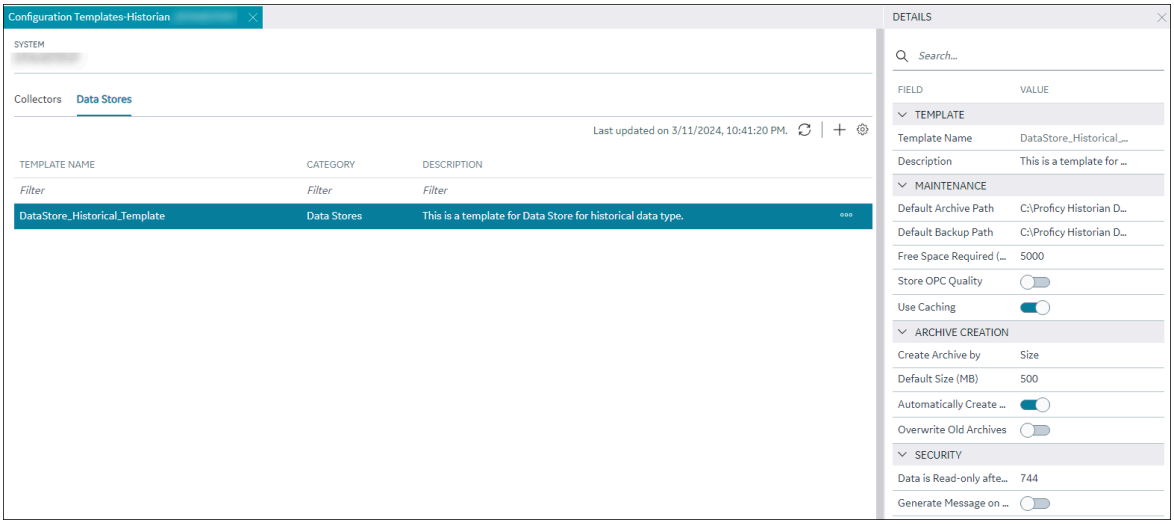
4. Select +.

   The **Data Stores:Configuration Template** window appears.



5. In **TEMPLATE NAME**, enter a name for the template. You can enter any alphanumeric names and also use special characters.
6. In **DESCRIPTION**, enter a description for your template. The description box can do a spell check while you enter the description.
7. Select **Add**.

   The configuration template is created.



8. Select the row that contains the created template.
   The data store details appear in the **DETAILS** section.

Table 56. The Template Section

Field	Description
Template Name	The name of the template. This field is read-only.
Description	The description of the template. You can edit the description if needed.

Table 57. Maintenance

Field	Description
Default Archive Path	The default folder in which you want to create archives.
Default Backup Path	The default folder in which you want to place the backup archives.
Free Space Required (MB)	Indicates the remaining disk space required after a new archive is created. If the available space is less than the requirement, a new archive is not created. The default value is 5000 MB. This field is not applicable to alarms and events archives. The alarms and events archiver will continue writing to the alarms and events archive until the drive is full. If this occurs, the alarms and events archiver will buffer incoming alarms and

Field	Description
	events data until the drive has free space. An error message is logged in the Historian message log.
Store OPC Quality	Indicates whether OPC data quality is stored.
Use Caching	Indicates whether caching is enabled. When reading data from the archiver, some data is saved in the system memory and retrieved using caching. This results in faster retrieval as the data is already stored in the buffer.

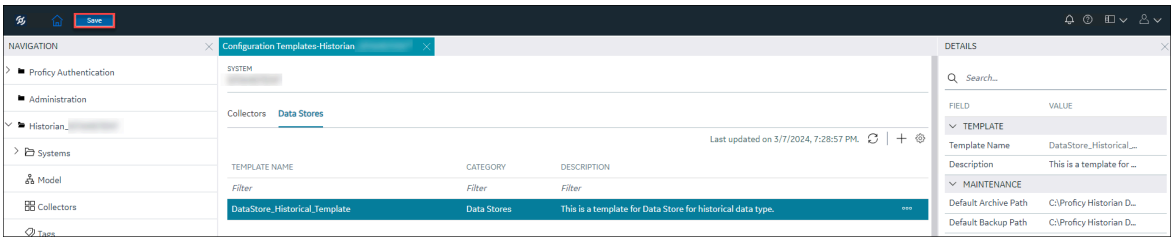
Table 58. Archive Creation

Field	Description
Create Archive by	Indicates whether you want to create a new archive automatically after the current one reaches a specific size or after a specific duration. This field is enabled only if you switch the **Automatically Create Archives** toggle on. Select one of the following options: ◦ **Size**: Select this option if you want to create a new archive when the current one reaches a specific size. Specify the size in the **Default Size (MB)** field (which appears only if you select **Size**). ◦ **Days** or **Hours**: Select one of these options if you want to create a new archive after a specific duration. Specify the duration in the **Archive Duration** field (which appears only if you select **Days** or **Hours**).
Default Size (MB)	The default size of an archive after which a new one will be automatically created if you switch the **Automatically Create Archives** toggle on. The **Default Size (MB)** field appears only if you select **Size** in the **Create Archive By** field.
Automatically Create Archives	Indicates whether you want to create an archive automatically *(on page 1446)* after the current one is full. An archive file is considered full based on the size or duration you specify in the **Create Archive By** and the **Archive Duration** or **Default Size** fields.

Field	Description
Overwrite Old Archives	Indicates whether you want to overwrite an old archive file when a new one is created. If you enable this option, the oldest archived data is replaced with the latest one when the latest archive default size is reached. Since this action deletes historical data, exercise caution in using this feature. Be sure that you have a backup of the archive so that you can restore it later. Best practice is to create an additional archive to prevent premature loss of data due to overwriting. For example, if you want to save 12 months of data into 12 archives, create 13 archives.

Table 59. Security

Field	Description
Data is Read-Only After (Hours)	The number of hours for data to be stored in a read/write archive. After the time lapses, that portion of the archive file is automatically made read-only. Incoming data values with time-stamps prior to this time are rejected. A single archive file, therefore, may have a portion made read-only, another portion that is read/write containing recently written data, and another that is unused free space.
Generate Message on Data Update	Indicates whether an audit log entry will be made any time the value of a previously archived data point is overwritten. This log entry will contain both the original and new values.



9. After you edit the details as needed, in the upper-left corner, select **Save**.
   The configuration details are saved.

   You can select ••• and duplicate this template, edit, or delete it.

You can apply the configuration template to a data store *(on page 1182)*.

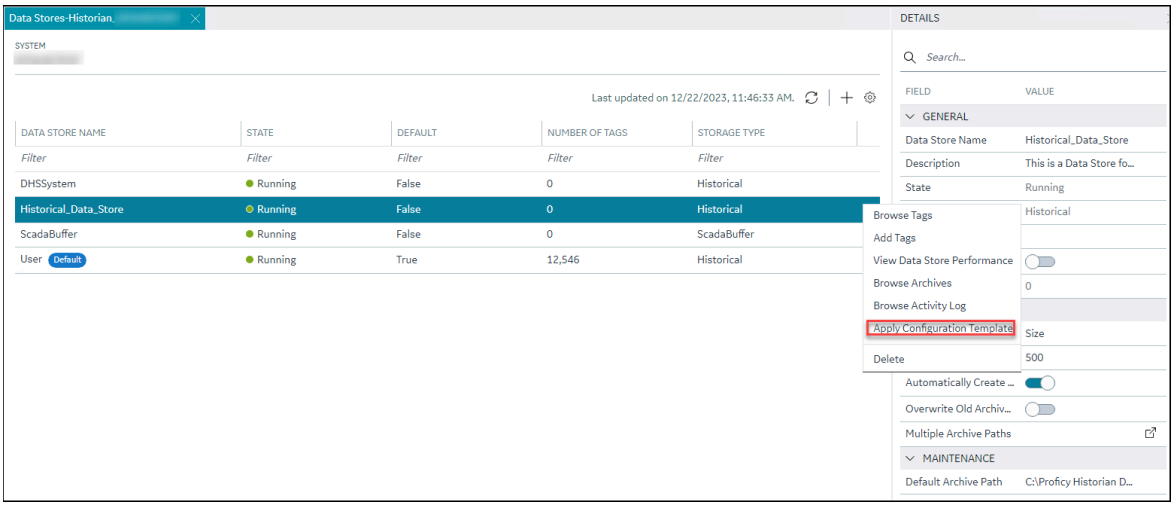
Apply the Configuration Template to a Data Store

You can apply the created template to user-created data store as needed. You will be prompted to confirm whether you want to overwrite few of the configuration values with the values in the template.

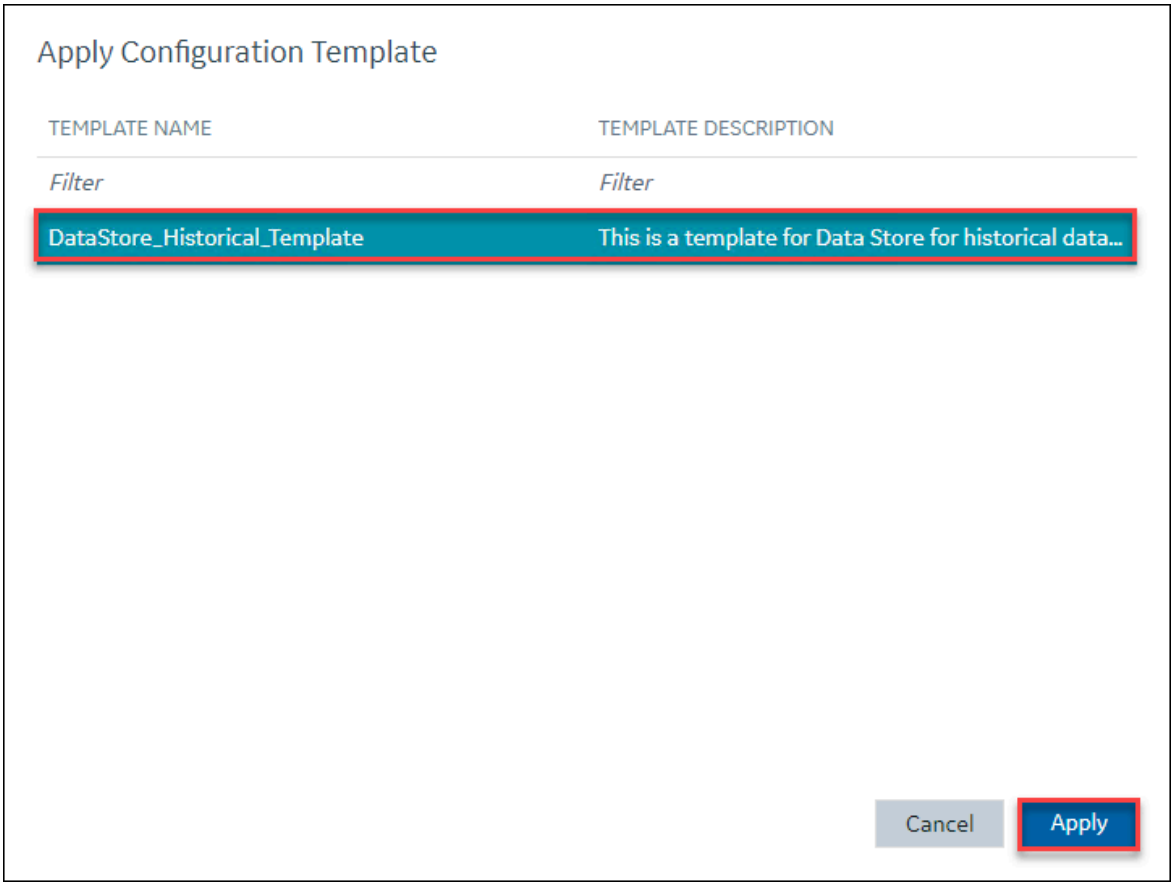
- Ensure that you have a data store created *(on page 1089)*.
- Ensure that you have a configuration template for data stores *(on page 1486)*.

This topic describes how to apply a data store configuration template to a data store. You can apply a data store configuration template to a user-created data store, provided they are not the default data store.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Data Stores**. The **Data Stores** section appears.
3. Right-click the data store (or select), and then select **Apply Configuration Template**.



The **Apply Configuration Template** window appears, listing the available templates.



Note:
You can apply a data store configuration template to a user-created data store, provided they are not the default data store.

4. Select **Apply**.
   A confirmation window appears, prompting you to confirm whether you want to overwrite few of the configuration values with the values in the template.
5. Select **Ok**.
6. In the upper-left corner, select **Save**.
   The configurations in the template are applied to the data store.

Managing Reports

About Reports

Reports provide you with a concise summary of tag-specific data of a specific collector.

You can select a report from the available predefined templates and generate a report to view categorized data. For example, you can generate a report that lists tags with aliases and view the needed information. You can also export the generated report as a CSV file or save it as a PDF file.

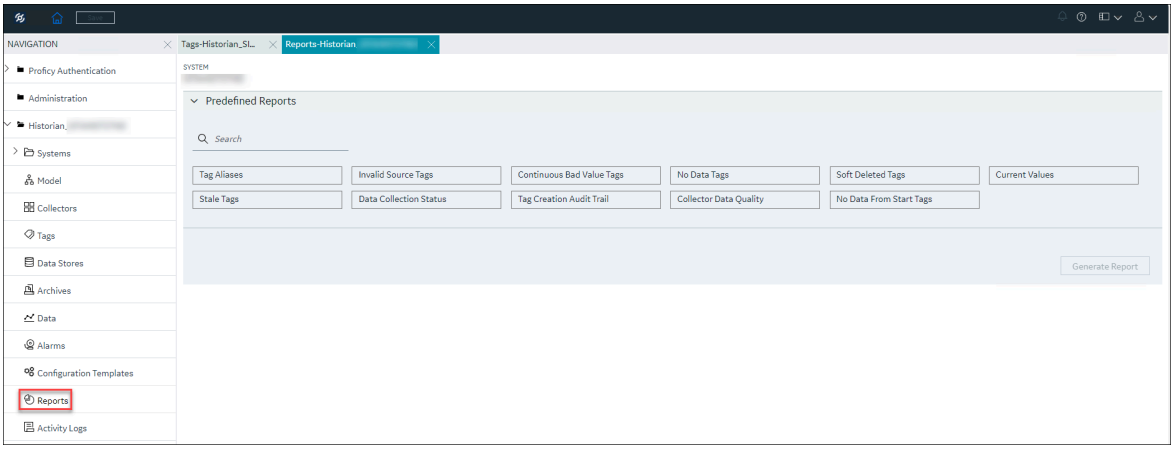
Note:
The reports are applicable only to the Historian destination collectors.

For more information on generating reports, refer to generate reports *(on page 1493)*.

Generate Reports

This topic describes how to generate report using a predefined template. You can select template from the available template options and generate a report.

1. Access Configuration Hub *(on page 1055)*.
2. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Reports**.
   A list of predefined templates appear.



3. Select a template as needed.
   The corresponding input options appear, enabling you to select the collector and other options as needed. Based on your selections, you can generate the report.
4. Select the collector and other corresponding options.

   Note:
   To generate a report, you must select a collector.

   The below table lists different reports and their corresponding input options.

Report	Description	Input Options	Data Available in the Report
Tag Aliases	This report displays tags that have aliases, along with the list of aliases for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated.	◦ TAG NAME
Invalid Source Tags	This report displays tags with a collector name but no configured source address for the selected collector instance. **Note:** This report is not applicable for a File collector.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated.	◦ TAG NAME ◦ DESCRIPTION
Continuous Bad Value Tags	This report displays tags that are continuously returning bad data for the selected Time Interval for the collector instance. You can carefully analyze those tags and make decisions.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated. ◦ TIME INTERVAL- The duration based on which the report must be generated. The available options are, ▪ 1 hour ▪ 8 hours ▪ 1 day ▪ 1 week ▪ 1 month	◦ TAG NAME ◦ DESCRIPTION

Report	Description	Input Options	Data Available in the Report
		▪ Custom- Selecting this option enables a custom start and end date/time selector. You can select or enter a custom start and end date/ time based on which the report must be generated.	
No Data Tags	This report displays tags that are not writing any data for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated. ◦ TIME INTERVAL- The duration based on which the report must be generated. The available options are, ▪ 1 hour ▪ 8 hours ▪ 1 day ▪ 1 week ▪ 1 month ▪ Custom- Selecting this option enables a cus-	◦ TAG NAME ◦ DESCRIPTION ◦ VALUE ◦ TIME STAMP ◦ DATA COLLECTION

Report	Description	Input Options	Data Available in the Report
		tom start and end date/time selector. You can select or enter a custom start and end date/time based on which the report must be generated.	
Soft Deleted Tags	This report displays tags that were removed from the system but still exist in Historian and are not being used for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated. ◦ TIME INTERVAL- The duration based on which the report must be generated. The available options are, ▪ 1 hour ▪ 8 hours ▪ 1 day ▪ 1 week ▪ 1 month ▪ Custom- Selecting this option enables a custom start and end date/time selector. You can select or	◦ TAG NAME ◦ DESCRIPTION ◦ DELETION TIME ◦ USER NAME

Report	Description	Input Options	Data Available in the Report
		enter a custom start and end date/ time based on which the report must be generated. ◦ USERNAME- The name of the user based on which the report must be generated.	
Current Values	This report displays the current values of tags for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated.	◦ TAG ◦ ENGINEERING UNITS (DESCRIPTION) ◦ QUALITY ◦ VALUE ◦ TIME STAMP
Stale Tags	This report displays all the stale tags for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated.	◦ TAG NAME ◦ DESCRIPTION
Data Collection Status	This report displays the data collection status of tags for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated. ◦ DATA COLLECTION- The status of da-	◦ TAG NAME ◦ DESCRIPTION ◦ DATA COLLECTION

Report	Description	Input Options	Data Available in the Report
		ta collection based on which the report must be generated. The available options are, ▪ On ▪ Paused.	
Tag Creation Audit Trail	This report displays information about tag creation time and created user.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated. ◦ TIME INTERVAL- The duration based on which the report must be generated. The available options are, ▪ 1 hour ▪ 8 hours ▪ 1 day ▪ 1 week ▪ 1 month ▪ Custom- Selecting this option enables a custom start and end date/time selector. You can select or enter a custom start and end date/time based	◦ TAG NAME ◦ DESCRIPTION ◦ CREATION TIME ◦ CREATED BY

Report	Description	Input Options	Data Available in the Report
		on which the report must be generated. ◦ CREATION TIME- The time of creation based on which the report must be generated. ◦ CREATED USER- The name of the user based on which the report must be generated.	
Collector Data Quality	This report displays the data quality of tags for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated.	◦ COLLECTOR NAME ◦ DESCRIPTION ◦ TOTAL TAG COUNT ◦ BAD TAGS COUNT ◦ BAD TAGS PERCENT ◦ GOOD TAGS COUNT ◦ GOOD TAGS PERCENT
No Data From Start Tags	This report displays tags that do not have data from the time they were created for the selected collector instance.	◦ COLLECTOR NAME- Name of the collector instance based on which the report must be generated.	◦ TAG NAME ◦ DESCRIPTION

5. Click **Generate Report**.
   The data corresponding to the selected report appears.

You can export the generated report as a CSV file *(on page 1500)*, or save the generated report as a PDF file *(on page 1500)*.

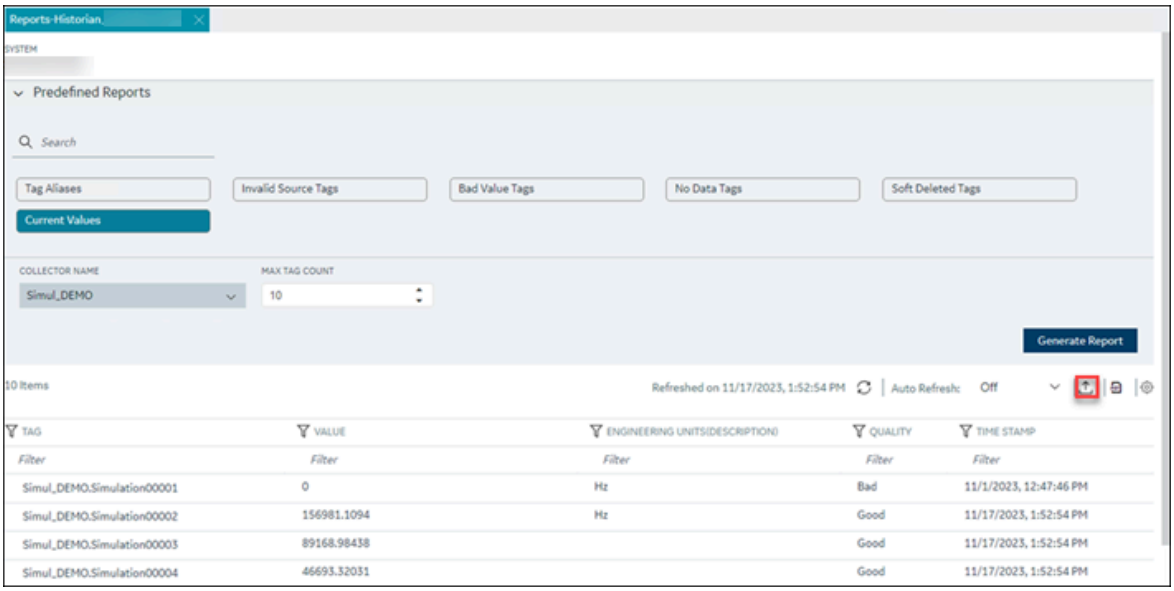
Export the Generated Report as a CSV File

This topic describes how to export and save a report as CSV file.

Ensure that you have the following:

- Microsoft Excel or any text editor is needed to view the exported CSV file.

1. Generate the report *(on page 1493)* as needed.
2. To export the report as a CSV file, in the upper-right corner of the grid, select  .
   The report is exported as a CSV file.



   The file will be saved in the <System Name>_Reports_Export_Details_with_<ReportName> format. For example, **SYSTEMADMIN_Reports_Export_Details_with_CurrentValues**.

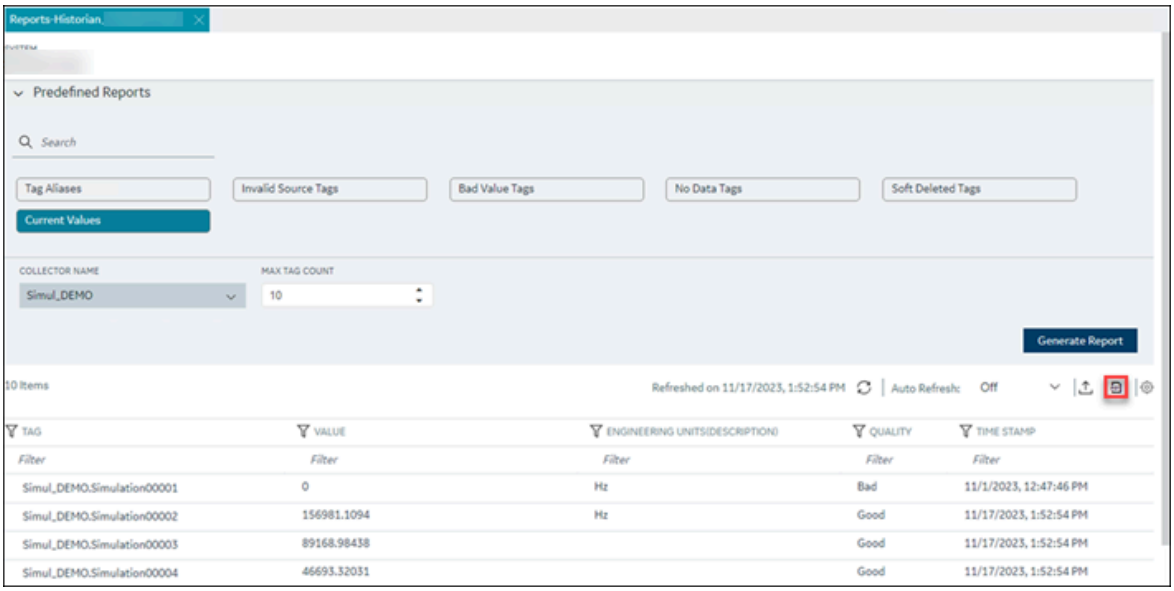
Save the Generated Report as a PDF File

This topic describes how to save the report as a PDF file.

Ensure that you have the following:

- A PDF reader is required to open and view the report saved as a PDF file.

1. Generate the report *(on page 1493)* as needed.
2. To save the report as a PDF file, in the upper-right corner of the grid, select  .
   The report is saved as a PDF file.



The file will be saved in the Reports_<System Name>_<ReportName>_<MM_DD_YYYY, hh_mm_ss AM/PM> format. For example, **Reports_SYSTEMADMIN_CurrentValues_10_17_2023, 1_30_20 AM**.

Access Activity Logs

Activity logs are generated when activities are performed in the Historian system.

Examples:

- When a tag is created, modified, or deleted
- When a collector instance is created, modified, or deleted
- When data collection for a tag or a collector begins or ends
- When an archive is created or will be closed soon

You can access these logs for each tag/collector or for all the tags and collectors in a system. You can filter these logs based on the start and end dates, priority, topics, and the content in the logs. You can also export all the logs or selected ones.

1. Access Configuration Hub *(on page 1055)*.
2. If you want to access activity logs for all the tags and collectors in a system, in the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Activity Logs**.
   A list of activity logs appears.
3. If you want to access the activity logs of a collector instance:

   a. In the **NAVIGATION** section, under the Configuration Hub plugin for Historian, select **Collectors**.
   A list of collectors in the system appears.

   b. Right-click the collector whose activity log you want to access (or select ⋯), and then select **Browse Activity Log**.
   A list of activity logs for the collector appears.

4. If you want to access the activity logs of a tag:

   a. In the **NAVIGATION** section, select **Historian_<system_name> > Tags**.
   A list of tags in the system appears.

   b. Right-click the tag whose activity log you want to access (or select ⋯), and then select **Browse Activity Log**.
   A list of activity logs for the tag appears.

5. If you want to filter the list of activity logs:

   a. In the upper-right corner of the main section, select  .

   b. Enter values as described in the following table.

Field	Description
START DATE/TIME	Select the start date and time for the activity logs.
END DATE/TIME	Select the end date and time for the activity logs.
PRIORITY	Specify whether you want to see only alerts or messages or both.
TOPIC	Select the topic based on which you want to filter the logs: ▪ **Configuration**: Includes modifying a collector instance or a tag configuration. ▪ **Connections**: Includes system connections and creating a collector interface.

Field	Description
	▪ **General**: Includes pausing or resuming data collection. ▪ **Performance**: Includes creating or closing an archive and moving buffer files. ▪ **ServiceControl**: Includes starting or stopping a collector interface. This list is not comprehensive.
ACTIVITY CONTAINS	Enter the content of the logs based on which you want to filter them.

c. Select **Apply**.
The logs are filtered based on the criteria.

If you want to export the logs, select  . The logs are exported into a CSV file.

Troubleshooting Historian and Configuration Hub

This topic contains solutions/workarounds to some of the common issues encountered with Configuration Hub. This list is not comprehensive. If the issue you are facing is not listed on this page, refer to Troubleshooting Web-based Clients *(on page)* and Troubleshooting the Historian Server *(on page)*.

Unable to Access Configuration Hub After Upgrading Web-based Clients

Workaround: Clear your browser cache.

Even after installing Web-based Clients, you cannot access Configuration Hub.

Workaround: Start the Proficy Operations Hub Httpd Reverse Proxy and the Data Archiver services.

Unable to Access External Configuration Hub if Public Https Port is Different

Issue: During Web-based Clients installation, if you provide an existing Proficy Authentication and Configuration Hub details, and if the public https port numbers of these two machines do not match, you cannot access the external Configuration Hub from the current machine.

For example, suppose you have installed Web-based Clients on machine A, which points to the Proficy Authentication and Configuration Hub installed on machine B. If the public https port numbers of

machines A and B do not match, you cannot access Configuration Hub of machine B from machine A (although you can access it locally from machine B).

Workaround: Perform the following steps on the machine on which you have installed Configuration Hub (machine B):

1. Access the following folder: `C:\Program Files (x86)\GE\ConfigurationHub\Web\conf\confighub`
2. Access the file that contains the details of the machine from which you want to access external Configuration Hub (machine A). The file name begins with the host name of machine A.
3. In the line that contains the details of the Proficy Authentication server (for example, proxy_pass https://machine_B.Domain.com:Port/uaa/), change the port number to match the public https port number of machine B.
4. Save and close the file.
5. Restart the following services:
    - ConfigHubContainerService
    - ConfigHubNGINXService
    - ConfigHubStorageService

Error Occurs When Historian Plugin is Registered with an External Configuration Hub

Description: If you install Configuration Hub using iFIX, then install Web-based Clients on another machine with local Proficy Authentication, and then register the Historian plugin with Configuration Hub, testing the connection to Configuration Hub fails. Even after you add the IP addresses of both the machines to the hosts file, the issue is not resolved.

Error Message: Error while getting token in ConfigAuth App

Workaround: Register the Historian plugin *(on page)* on the machine on which you have installed Web-based Clients, install the Proficy Authentication certificate *(on page)*, and then restart the browser.

Cannot Access the Collectors Section or Add a Collector Instance

Possible Cause: User credentials not provided while installing collectors or Remote Collector Manager:

If installing collectors and the Historian server on the same machine, the collectors installer does not mandate the entry of username and password because it not required for Remote Collector Management Agent to connect to a local Historian server. But if Historian security or strict authentication is enabled, it is mandatory to enter the username and password.

Workaround:

- **Option 1:** Disable the strict collector authentication using Historian Administrator, and then restart the Historian Remote Collector Management Agent service.
- **Option 2:** Reinstall Remote Management Agents, providing the user credentials.

Cannot Access or Add a System in Configuration Hub

Possible Causes:

- **User does not have security privileges:** During installation of the Historian server, if you have allowed the installer to create security groups, you must create a user with the name in the following format: <Proficy Authentication host name>.admin. Verify that this user has been created and added to the ihSecurityAdmins group.

  If the Proficy Authentication server hostname is long, resulting in a username longer than 20 characters, Windows does not allow you to create the user. In that case, you can create a Proficy Authentication user, and then create the corresponding Windows user, using the Proficy Authentication Configuration utility:

  1. Access the Proficy Authentication Configuration utility. By default, it is located at `C:\Program Files\GE Digital\Historian Config\uaa_config_tool`.
  2. Run the following command: `uaa_config_tool add_user -u <username> -p <password> -s <the client secret you provided while installing the Historian server> -c`

     Example: `uaa_config_tool add_user -u adminuser -p Password123 -s pwd@123 -c`
- **Incorrect Proficy Authentication details:** You must provide the host name of the Proficy Authentication server while installing the Historian server. In the `Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Intellution, Inc.\iHistorian\SecurityProviders\OAuth2` registry path, verify that the URI value is in the following format: `https://<Proficy Authentication host name>:<port number>/uaa/check_token`.

  If needed, modify the value, and then restart the Data Archiver service.

Error Appears When Creating a Collector Instance

Description: When you add a collector instance, the following error message appears: `The server encountered an error processing the request. Please try again.` The collector instance is added successfully, but it does not appear in the **Collectors** section.

Possible causes: When you add a collector instance, the collector service is started and stopped so that it is connected to the Historian server. The collector then appears in the table in the **Collectors** section. Sometimes, however, the collector service does not respond to these commands on time, resulting in the error message. If you attempt to add the same collector instance again, a message appears, stating that it exists.

Workaround: Select **Cancel**, and refresh the **Collectors** section. If the collector instance still does not appear, access the collector machine, and start the collector manually.

Data Archiver is Shut Down

Possible causes: If there is insufficient disk space, the Data Archiver shuts down and a message is logged into the log file. By default, you can view the Historian archiver log file in C:\Historian Data \LogFiles.

Workaround: Allocate more disk space for archives, or remove old archives. You can also configure Historian to overwrite old archives automatically by switching the **Overwrite Old Archives** toggle on. If you enable this option, the oldest archived data is replaced with the latest one when the latest archive default size is reached. Since this action deletes historical data, exercise caution in using this feature. Be sure that you have a backup of the archive so that you can restore it later. Best practice is to create an additional archive to prevent premature loss of data due to overwriting. For example, if you want to save 12 months of data into 12 archives, create 13 archives.

For instructions, refer to Access a Data Store *(on page 1172)*.

Proficy Authentication and other Configuration Hub Plugins are not Visible in Configuration Hub, but Historian Plugin is Visible

Description: Consider that you used the Proficy Installer and installed common components such as Proficy Authentication and Configuration Hub. Then, you installed Historian Web components and registered Historian Plugin during the installation process. When you try to access Configuration Hub, the Historian Plugin is visible. However, the Plugins like Proficy Authentication, Administrator, and others are not visible. To resolve this issue, perform the below workaround.

Workaround:

1. From your desktop, select **Setup Authentication**.

   The **Configuration Hub Login** window appears.
2. In the bottom-right corner, select **Configure Confighub Authentication**.

The **Configuration Hub Administrator Credentials** window appears.

3. Enter the Configuration Hub Client ID and Secret that were created while installing Configuration Hub.
4. Select **Verify**.

   On a successful verification, the **Register with Proficy Authentication** window appears.

5. In **SERVER NAME (FULLY QUALIFIED NAME)**, enter the server name in a Fully Qualified Domain (FQDN) format.
6. In **SERVER PORT**, enter the Proficy Authentication Server port, by default, it is 443.
7. Enter the Configuration Hub Client ID and Secret that were created while installing Configuration Hub.
8. Select **Register**.
9. Log in to Configuration Hub and see if the other Plugins are also displayed.

   On a successful registration, you will see all the other Plugins that were registered.

Chapter 7. Operations Hub

Operations Hub Overview

Operations Hub is an end-to-end solution for developing, managing, and delivering applications to leverage the capabilities of big data analytics and the internet of things.

Using Operations Hub, you can create applications to collect and analyze data from a machine or a server, and trigger actions based on certain events.

Operations Hub provides a user-friendly interface to create components of an application such as queries, database tables (called entities), events, email templates, users, and so on without the need to use your programming skills. You can also design pages and dashboards using these components.

Advantages of using Operations Hub:

- Operations Hub is quick, easy, and cost-effective. You do not need programming skills to develop an application.
- Operations Hub applications use HTML5 and CSS3, making them platform-independent.
- You can access an application using a computer or a mobile device.
- You can provide controlled access to applications and data based on user roles.
- You can create entities and queries for a relational database.

Overview of Operations Hub with Configuration Hub

This topic describes how to work with Operations Hub using the latest (HMI powered designer) and the classic version. For more complete details on how to use Operations Hub, refer to the Operations Hub help.

With 2023 release, Operations Hub is now available as a plug-in in Configuration Hub. The latest version is equipped with a HMI designer layout, and has enhanced plug-in functionality. All the features from the classic version of Operations Hub are also available in this latest version.

1. Install the latest version of Operations Hub. Refer to Installation Process Overview *(on page 1509)*.
2. Log in to the Operations Hub classic and set up the following:
    - Data Sources (required)
    - Queries
    - Entities
    - Themes (optional)
3. Log in to the latest version of Operations Hub via Configuration Hub.

a. Double-click the Configuration Hub desktop shortcut.
b. Log in with the credentials that you specified during installation.
c. On the Configuration Hub navigation panel, navigate to the Operations Hub home page. For more information on using the Operations Hub new layout, refer to Panels Layout *(on page 1510)*.

4. Create an application.
5. Create pages for your application.
6. Use the following features to design your application pages:
   - Page Grid Details *(on page 1534)*
   - Design a layout using the coordinate card *(on page 1541)*.
   - Design a layout using the flexbox card *(on page 1536)*.
   - Apply format tools to design your pages *(on page 1529)*.
   - Connect plug-ins with a line connector *(on page 1530)*.
   - Animate HMI graphics *(on page 1546)*.
   - Bind data to your plug-ins *(on page 1521)*.
7. Save the application pages, and preview the end application.

Installation Process Overview

This topic provides an overview of installing Operations Hub successfully.

You can install Operations Hub from the Proficy Installer package (ISO), which is distributed as follows:

- **Standalone ISO**: Includes common components (Proficy Authentication, Configuration Hub) and Operations Hub.
- **SCADA ISO**: Includes iFIX or CIMPLICITY, common components (Proficy Authentication, Configuration Hub), and Operations Hub.

The following table outlines the key milestones involved in installing Operations Hub.

#	Task	Description
1	Ensure that your system meets the minimum requirements.	Refer to the *System Requirements* topic in the Operations Hub documentation for the necessary hardware, software, and network configurations to run Operations Hub successfully.
2	Verify the features included with your license.	Refer to the *Understanding Operations Hub Licensing Tiers* topic in the Operations Hub documentation.

#	Task	Description
3	Run the Proficy installer to install Proficy Authentication and Configuration Hub.	For step-by-step instructions, refer to the *Install Common Components* topic in the Operations Hub documentation.
4	Run the Proficy installer to install Operations Hub.	For step-by-step instructions, refer to the *Install Operations Hub* topic in the Operations Hub documentation.
5	If you opted to register Operations Hub with Configuration Hub after install, then do it now. **Note:** You cannot have multiple instances of Operations Hub in Configuration Hub.	For more information, refer to the topic *Install Time Registration* in the Configuration Hub documentation.

You will need to install a security certificate on each client where you want to access Operations Hub. For step-by-step instructions, refer to the *Install the Certificate on your Clients* topic in the Operations Hub documentation.

Note:
If installing Operations Hub remotely from Configuration Hub, make sure that the Operations Hub certificate is trusted by Configuration Hub. If not trusted, then the request to load plug-ins gets blocked.

To install a newer version of Operations Hub over an existing installation, refer to the *Upgrade Operations Hub* topic in the Operations Hub documentation.

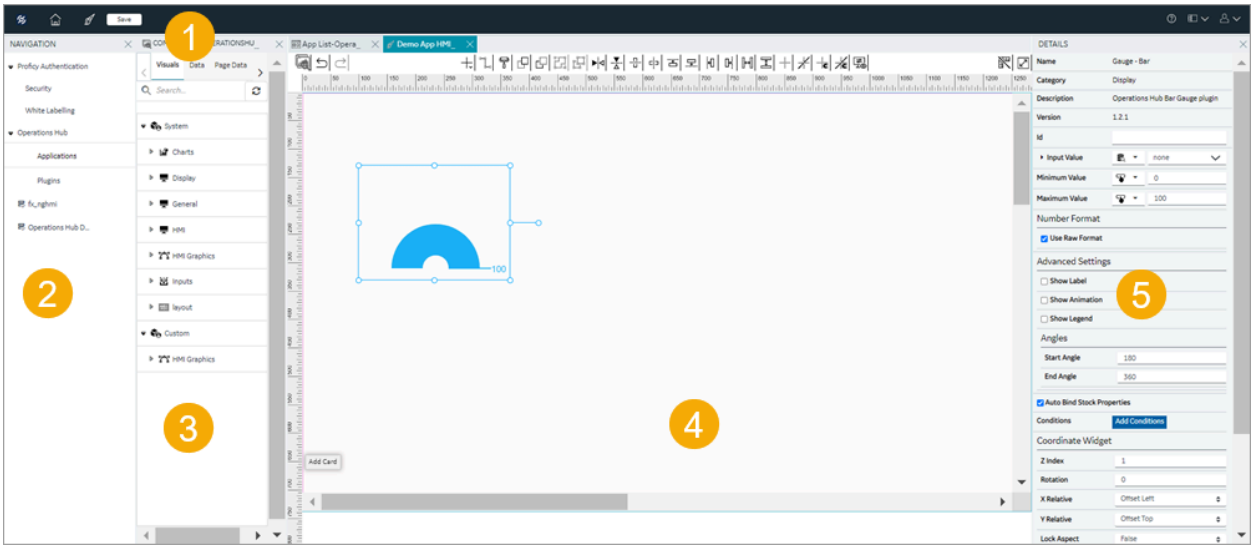
To perform a command-line installation of Operations Hub, refer to the *Install Operations Hub in Unattended Mode* topic in the Operations Hub documentation.

Operations Hub (New Layout)

Panels Layout

This topic provides an overview of the latest Operations Hub application layout.

Log in to the latest version of Operations Hub via Configuration Hub and access the Operations Hub home page. The following screen provides an overview of all the panels that appear in the Operations Hub new layout.



1	Toolbar Menu *(on page 1511)*
2	Navigation Panel *(on page 1512)*
3	Components Panel *(on page 1515)*
4	Display Panel *(on page 1527)*
5	Details Panel *(on page 1532)*

Toolbar Menu

The toolbar contains the following menus:

	Select this icon to reload the application.
	Select this icon to work in the configuration mode, wherein you are connected to the Configuration Hub navigation panel.
	Select this icon to work in the Operations Hub designer mode. The Configuration Hub navigation panel is disconnected to allow more work area for Operations Hub designer.
Save	The **Save** button on the toolbar is highlighted whenever you modify settings.

	Select this icon to access Operations Hub online documentation.
	Select the icon to open/close **Navigation** and **Details** panels for a clutter-free workspace.
	Select this icon to logout of the application.

Navigation Panel

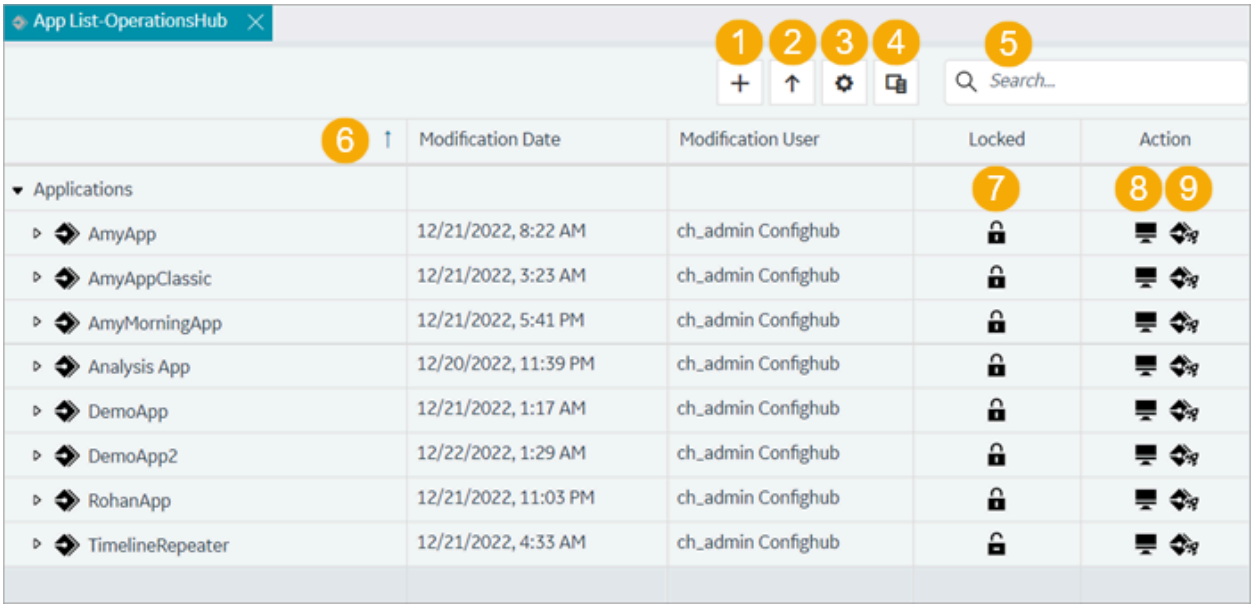
This topic provides an overview of the navigation panel from Configuration Hub in the Operations Hub new layout.

On this panel, you can navigate to other Proficy applications installed within your Configuration Hub environment. Under Operations Hub, you have access to the following areas:

- Applications *(on page 1512)*
- Plug-ins *(on page 1514)*

Applications

On the applications homepage, you can perform tasks as described in the following table.



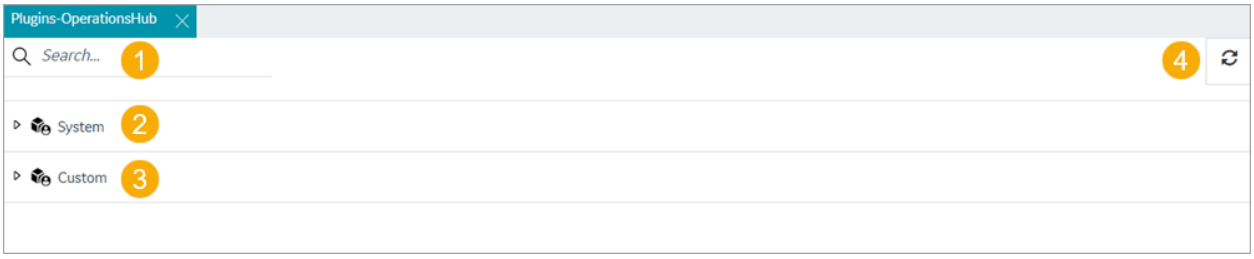
1	Creates a new application.
2	Imports application and pages.

	For more information on importing applications and pages, refer to the Operations Hub documentation.
3	Allows to perform the following actions: • **App Actions**: A selection check box appears next to the applications and allows to perform related operations. • **Page Actions**: A selection check box appears next to the pages and allows to perform page related operations. You must select the app to show page check box. • **Clear**: Clears all selection check boxes.
4	Opens a **Column Chooser** dialog. Select the check box for the columns you want to show on the applications homepage. To hide columns, clear the respective check box. • **Description**: Displays a column that contains a brief description of each app/page. • **Creation Date**: Displays a column that tracks the date and time when the app/page was originally created in Operations Hub. • **Creation User**: Displays a column that contains the user ID who initially created the app/page. • **Modification Date**: Displays a column that tracks the date and time when the app/page was last modified. • **Modification User**: Displays a column that contains the user ID who last modified the app/page. • **Locked**: Displays a column that contains a lock/unlock status to indicate the editing status for the app. • **Navigation Order**: Displays a column that contains a numerical value representing the order in which the pages are navigated. By default, application pages are sorted alphabetically on page load. To sort pages by their runtime navigation order, select the **Order** column header. This sorted order is how the pages will be arranged at runtime when the application is launched. You also have the option to change the sequence of pages: Select a page and then move it to a different position in the order by drag-

	ging it. The sequence order can be modified only if the App is in unlocked state. To revert to the alphabetical order, simply select the column header that contains application page names.
5	Enter keywords to search for applications or pages.
6	Sorts columns in ascending or descending order. The status is indicated by the up/down arrow on each sortable column header.
7	Indicates whether the application is in a locked or unlocked state.
8	Allows to perform tasks on the selected application or page. You can either: • Select this icon for the app/page to access task actions, (OR) • Right-click the app/page to access task actions. Existing app/page names are quickly editable on the homepage itself. **Note:** Applications/pages created in the Operations Hub Classic version cannot be modified in the new Operations Hub layout. Such applications are marked as legacy apps. You can only preview them. For more information on applications and pages, refer to the Operations Hub documentation.
9	Opens the end application.

Plug-ins

On the plug-ins homepage, you can perform tasks as described in the following table:



1	Enter keywords to search for plug-ins.

2	Expand **System** to view the system plug-ins available in Operations Hub. See also Visuals Tab *(on page 1517)*.
3	Expand **Custom** to view custom plug-ins. If you have saved any customized plug-ins, then they appear under custom plug-ins.
4	Reloads the plug-ins screen.

For a high-level panel layout, see Panels Layout *(on page 1510)*.

Components Panel

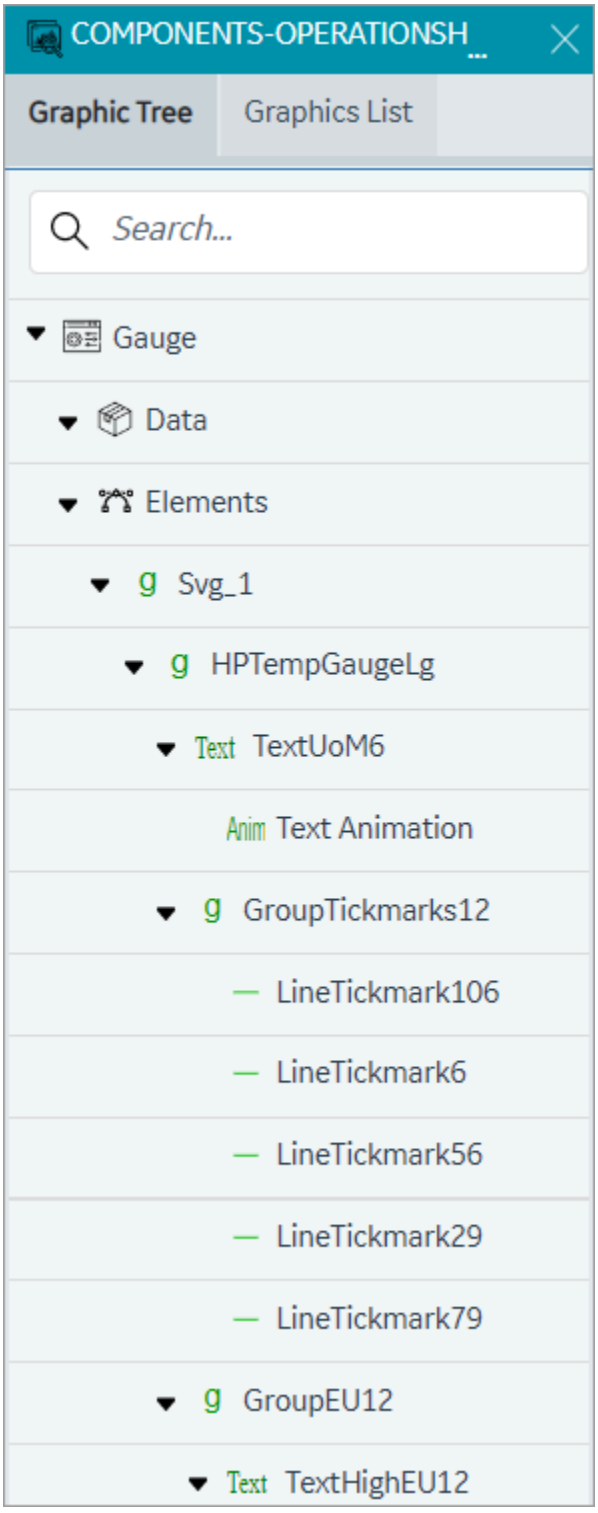
This topic provides an overview of the components panel in the Operations Hub new layout.

On Operations Hub components panel, you can access the following tabs for designing application pages:

- Visuals *(on page 1517)*
- Data *(on page 1521)*
- Page Data *(on page 1524)*
- Page Visuals *(on page 1526)*

On Operations Hub components panel, you can access the following tabs while working with the SVG editor:

- **Graphic Tree**: On this tab, expand the tree-view structure to review the properties currently configured for the graphic.
- **Graphics List**: On this tab, you can access all the plug-ins listed under the custom category.



For a high-level panel layout, see Panels Layout *(on page 1510)*.

Visuals Tab

This tab provides access to system and custom plug-ins in Operations Hub.

You can configure the plug-ins to work with the components of an application, such as entities and queries.

1. Open an application page.
2. Select the **Visuals** tab.
3. Drag-and-drop the plug-ins to design your page.

   You can also double-click a plug-in to add to the page.

Following list of plug-in categories are available as **System** plug-ins:

- Charts *(on page 1517)*
- Display *(on page 1518)*
- General *(on page 1519)*
- HMI *(on page 1519)*
- HMI Graphics *(on page 1520)*
- Inputs *(on page 1520)*
- Layout *(on page 1521)*

The **Custom** plug-ins contains the list of plug-ins saved with custom functionality. Refer to About HMI Graphics *(on page 1546)*.

Plug-in Enhanced Preview

Enhanced preview enables to access the real-time data preview within the page designer itself. Some of the plug-ins under Charts *(on page 1517)*, Display *(on page 1518)*, and Inputs *(on page 1520)* are powered with an enhanced preview feature. This means that the plug-in preview (within the designer) is the same as the result that appears in the end application. Refer to the respective plug-in categories for a full list of plug-ins that support enhanced preview.

Currently, the enhanced preview feature works only when the data is bound to the plug-in using the manual *(on page 1534)* option. Data binding via other methods does not support enhanced preview.

Charts

Except timeline, spider chart, trend card, and histogram, the enhanced preview feature is available for all the charts category plug-ins.

Bullet Graph	Compares a single value to a target value. Available variants are bullet graph and bar graph.
Histogram	Creates a visual representation of data distribution.
Spider Chart	Visualizes data in a web-like pattern to compare and analyze multiple data sets.
Trend Card	Helps to analyze data trends over a time period. **Note:** Do not rotate the trend card plug-in in the page designer.
Variwide Chart	Each column in a variwide chart has a separate width to represent the third dimension. Helps to analyze multi-dimensional data.
Sparkline	Visualizes events over a time span. The chart displays each data point of a set of time series data as a separate event along a horizontal line. Creates tiny data charts that can fit into compact areas in your application.
Line Chart	Use a line chart to visualize data using data points.
Pareto Chart	Graphically summarize and display the relative importance of the differences between groups of data.
Pie Chart	Visualize data using data points that belong to different categories.
Timeline	Create visual charts that help to monitor the progress of your events.

Display

Except Datagrid and Pivot Grid, the enhanced preview feature is available for all the display category plug-ins.

Gauge Bar	Presents data in simple bar format.
Gauge Circular	Measure data values on a radial scale.
Gauge Linear	Measure data values on a linear scale.
Solid Gauge	Displays data in six different styles with alert and color limits.
Datagrid	Displays data in a tabular format. Supports grouping, filtering, and sorting column data. You can also animate the data cells.

Pivot Grid	Visualize data in a multi-dimensional format. You can apply conditions to format cells, filter rows/columns by value, and export data to a CSV file.
Image	Insert images in your application.
Indicator	Indicator with range limits and styling.
Simple Indicator	Simple indicator is a lighter version of the indicator plug-in.
List	Display data in bullet points.
Text	Create display-only text in your application.
Value Display	Displays data values with a variety of configurable properties.

General

Favorite Organizer	Create folders and organize your favorite trend charts.
iFrame	Load information from external sources.
Breadcrumb	Shows the hierarchy to the current asset and allows the user to select any item in the list to trigger a change of context to that asset. Use a bread-crumb for easy navigation in your application. **Note:** Do not rotate the breadcrumb plug-in in the page designer.
HTML Editor	Helps to create and edit HTML code.

HMI

Alarm Card	Provides details of the active alarms by their severity levels in the HMI/ SCADA system for the selected asset.
Alarm Count	Provides the total alarm count by their severity levels in the whole HMI/ SCADA system.
CIMPLICITY HMI Web-space	Opens an instance of the Webspace remote access application.
Mimic Card	Displays mimics from the SCADA systems.
iFIX HMI Webspace	Opens an instance of the Webspace remote access application.

HMI Graphics

Use the following list of graphics based on your specific application and industry requirements. See About HMI Graphics *(on page 1546)*.

Gauge	High performance HMI graphic to represent pressure, flow, temperature or level gauges.
Mixer	High performance HMI graphic to represent agitators or batch mixers.
Motor	High performance HMI graphic to represent AC/DC motors, etc.
Pump	High performance HMI graphic can be configured to provide real-time feedback on the pump's status, such as flow rate, pressure, temperature, etc.
Tank	High performance HMI graphic to represent storage, mixing, or pressure tanks.
Valve	High performance HMI graphic to represent centrifugal, displacement, or gear pumps.

Inputs

The enhanced preview feature is available for all the input category plug-ins.

Button	Trigger an action in your application.
Checkbox	Create mutually exclusive data options.
Date Picker	Display date and time in a variety of formats.
Dropdown	Create a drop-down list from which operators can select between multiple choices.
DateTime Range Picker	Display and edit beginning and ending date time pairs.
Radio Button	Create radio button selection list.
Slider	Generate a slider selection format.
Text Area	Create a text area in your application.
Textbox	Insert a text box wherein the operator can enter data that goes in to the database.
Toggle	Create a toggle switch.

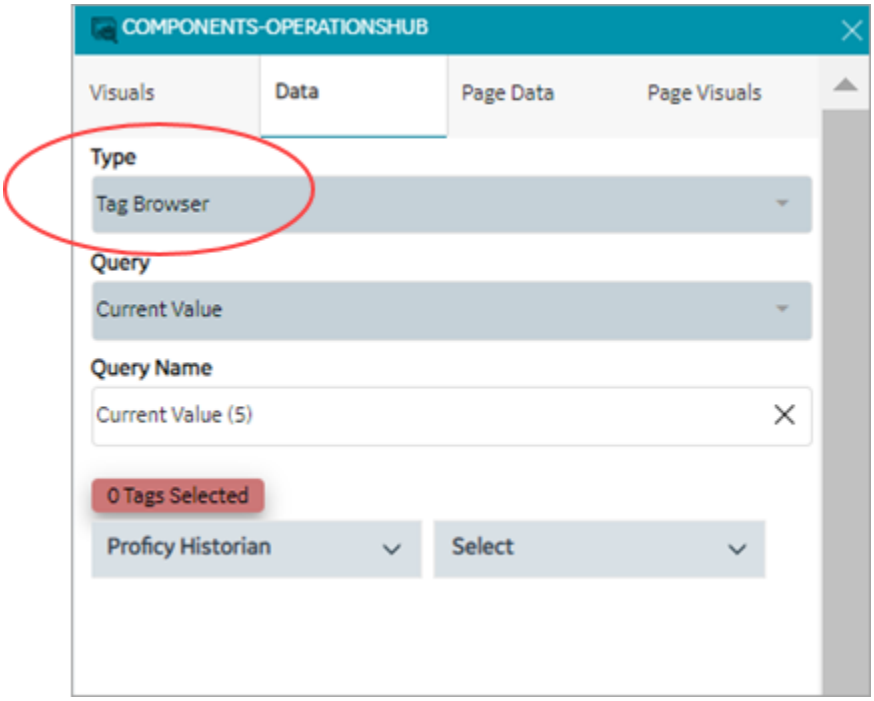
Layout

Interactive Map *(on page 1542)*	Create a coordinate/flex interactive map layout.
Repeater *(on page 1545)*	Create a flex repeater layout.

Data Tab

This tab displays the data types you can apply to the plug-ins.

Select your data type from the **Type** drop-down field.



Choose from the following data types:

- Tag Browser *(on page 1521)*
- Query *(on page 1522)*
- Globals *(on page 1522)*
- Admin Functions *(on page 1523)*
- M2M Functions *(on page 1523)*
- Asset Management Functions *(on page 1524)*

Tag Browser

You can browse a data source and select the properties/tags.

1. From **Type**, select `Tag Browser`.
2. From **Query**, select an extension query.

   The selected query is populated in **Query Name**.
3. Browse the data source and select the check box for the tag/s you want add.
4. Drag and drop the tags on the plug-in to bind data.

Query

1. From **Type**, select `Query`.
2. From **Query Type**, select the query type you want to use. The query types appear in the list box based on the queries you created in the Operations Hub classic version. For example, if you select `Extension` or `Entity`, additional selection fields appear.

`Extension`	Populates extension type of queries in the **Query** field. Select an extension query to add to the plug-in. The selected query is populated in **Query Name**.
`Entity`	Populates entities in the **Query** field. Select an entity to add to the plug-in. The selected entity is populated in **Query Name**.

3. Select **+ Add**.

Globals

1. From **Type**, select `Globals`.
2. From **Globals**, select any of these options:

`System`	Is associated to a computer's settings. Populates system date/ time variables.
`Output`	Is associated to query data fields. Populates available queries in the **Query** field. a. Select a query to populate its date fields. b. Select a data field from **Outputs**.
`Custom`	Allows you create your own customized global variable.

	a. Enter a name for the variable. b. Choose from the available data types to define the variable.
`URL Parameters`	Is associated to a URL address. Enter a name for the variable.

3. Select **+ Add Global**. All added globals appear on the **Page Data** tab.
4. Go to **Page Data** tab and select the global. The global details appear on the details panel.
5. On the details panel, you can specify the **Global Type** as `App` or `Page` global.
6. For custom and URL parameter global, enter the **Initial Value**.

Admin Functions

Use these functions to perform system administration tasks.

1. From **Type**, select `Admin Functions`.
2. Select from:

`Send Email`	Sends an email to specified recipient/s using the email sender service.
`DeleteAlertInstance`	Deletes the alert set for an asset object instance.
`StartStopAlertInstance`	Starts and stops the alert set for an asset object instance.
`Get all apps`	Retrieves a list of all applications in Operations Hub.
`Get all apps for user id`	Retrieves a list of all applications in Operations Hub that are associated with a specific user ID.
`Delete image on hard disk`	Deletes the image file on the logged-in user's hard disk.
`GetAllAlerts`	Retrieves a list of all alerts in Operations Hub.
`appGetCurrentUser`	Retrieves the current user of the application.
`GetEventByName`	Retrieves an event by its name.

3. Select **+ Add**.

M2M Functions

Perform machine-to-machine functions to control and manage devices remotely.

1. From **Type**, select `M2M Functions`.
2. Select from:

`Send_MQTT_Command`	Sends a command to a device using the MQTT (Message Queuing Telemetry Transport) protocol. The device must be configured with IQP MQTT.
`Send_REST_Command`	Sends a command to a device using the REST (Representational State Transfer) protocol.

3. Select **+ Add**.

Asset Management Functions

Use these functions to manage and track assets, such as devices and systems.

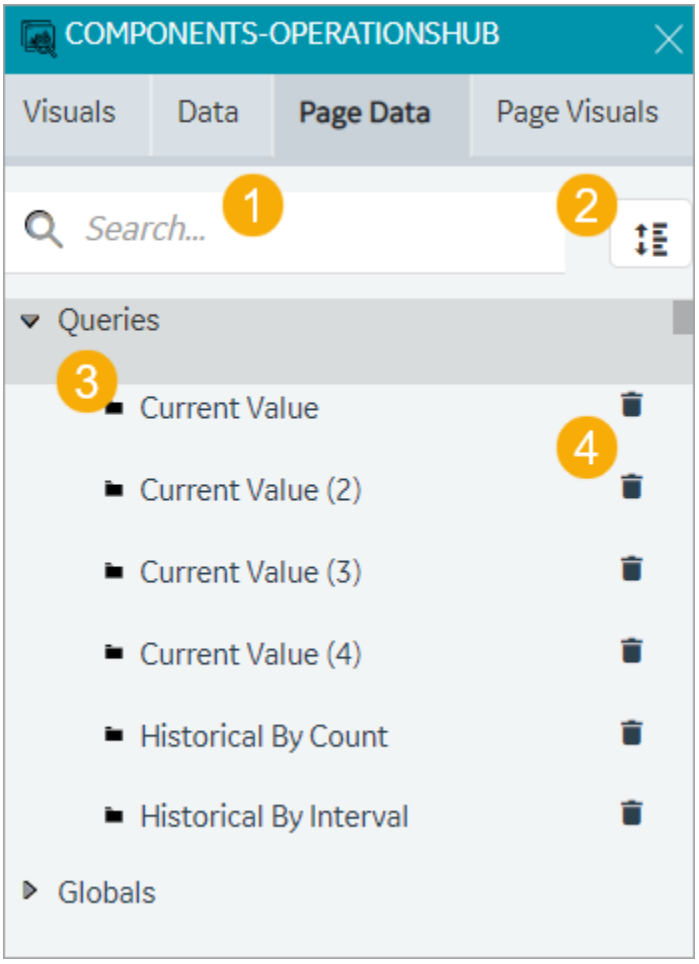
1. From **Type**, select `Asset Management Functions`.
2. Select from:

`Add new device type`	Creates a new category to classify similar type of devices.
`Add new metric to device type`	Adds a new measurement unit to the device type.
`Add new device`	Adds a new device (for example, Pump).
`Add new thing`	Adds a new thing (IoT devices)
`Add new group`	Creates a new group to gather and manage similar devices or things.
`Add device or thing to group`	Assigns a device or thing to a group.
`Add new device cloud`	Adds a new device cloud, which can be used to host and manage devices remotely.
`Add new cloud account`	Adds a new cloud account, which can be used to manage devices that are hosted on a cloud service.

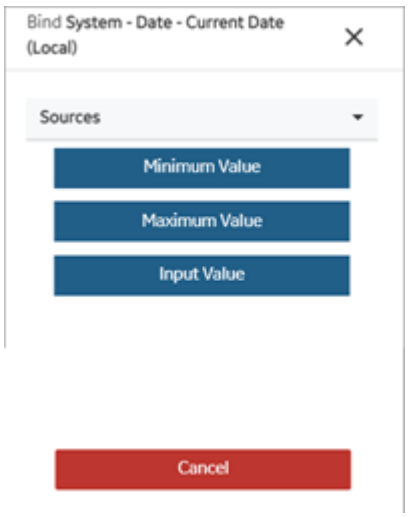
3. Select **+ Add**.

Page Data Tab

This tab displays the data applied to the page.



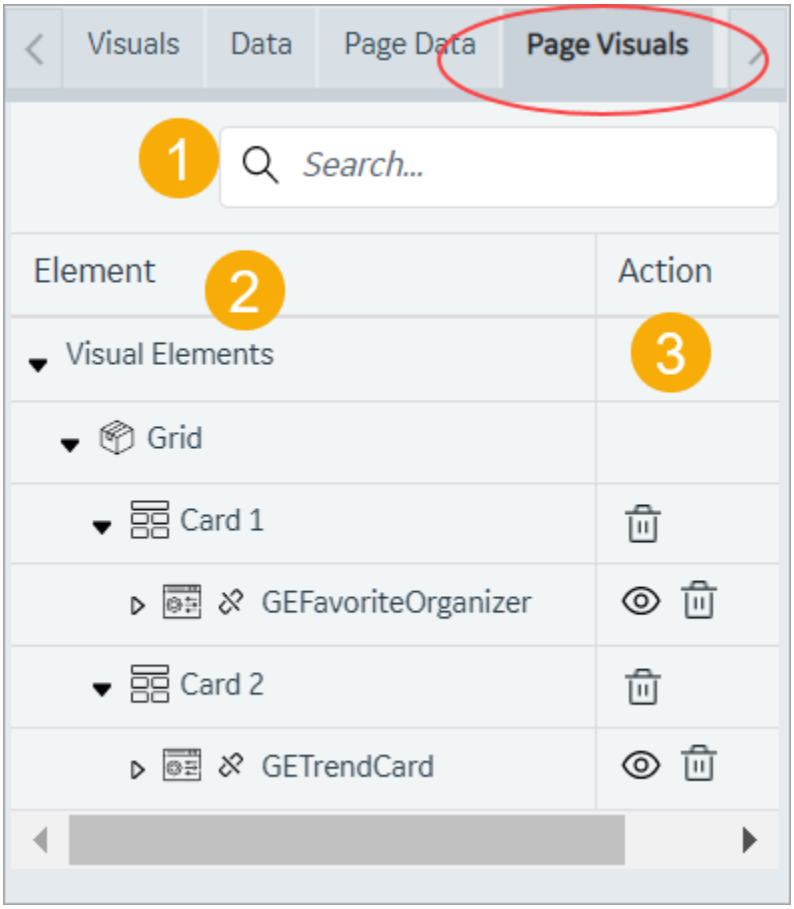
1	Enter keywords to search within the data (queries, globals, etc.) that is bound to the page.
2	Enable/Disable the icon to determine the functionality of drag-and-drop action.  When disabled, it is white in color. In this mode, you can drag-and-drop a global on the plug-in to perform auto binding of data. The drag-and-drop action invokes a list of plug-in properties to choose from, and binds data to the selected property.

	  When enabled, it turns blue. In this mode, you can drag and re-arrange the order of queries. To move a query up/down in a ordered list, simply select and drag the query item, and then drop it on the new location (up/down).
3	A tree-view of the data that is bound to the page.
4	Option to delete the data bound to the page.

Page Visuals Tab

This tab displays a visual overview of all the elements or objects on the page.

1. Open an application page.
2. Select **Page Visuals** tab.
3. Select any object on the page to locate its hierarchy in the tree layout.



1	Enter keywords to search within the elements added to the page.
2	Elements added to the page appear in a tree data structure showing their hierarchical relationship. To sort the elements in ascending/descending order, select the **Element** column header.
3	You can perform the following actions: • Delete at card-level. The card and the plug-ins within the card are deleted from the page. • Delete a plug-in added to the page. • Show/Hide a plug-in on the page.

Display Panel

This topic provides an overview of the display panel in the Operations Hub new layout.

The display panel serves as the display area for working with applications and their pages within Operations Hub.

See Page Grid Details *(on page 1534)*.

See Page Building Tools *(on page 1529)*.

For a high-level panel layout, see Panels Layout *(on page 1510)*.

Use Keyboard Shortcuts

These are the computer keyboard shortcut keys to perform UI operations:

UI Operation	Windows	Mac
Copy	Ctrl+C	Command+C
Paste	Ctrl+V	Command+V
Duplicate	Ctrl+D	Command+D
Toggle line connector mode	L	L
Toggle ruler	Ctrl+R	Command+R
Redo	Ctrl+Y	Command+Y
Undo	Ctrl+Z	Command+Z

Perform Operations Using Multi-Selection

You can select multiple objects on a layout or page visuals tab *(on page 1526)* and apply building tool operations *(on page 1529)*. To select multiple objects, hold down the `Shift` key on your keyboard and select the objects on the layout or visuals tab. Apart from using the build tools to manipulate multiple selected objects at a time, you can also:

- Move all selected objects to a different position within the layout by dragging them or using arrow keys.
- Resize/Scale all selected objects collectively.

Move Objects Using Arrow Keys

Using the arrow keys on your keyboard, you can control the movement or positioning of an object. You can also select and move multiple objects on a layout.

1. Select the object/s you want to move.
2. Use left/right/up/down arrow key to move left/right/upward/downward on the display area.

   The object/s moves one pixel per key stroke.
3. To continuously move the object/s in the associated direction, long press the respective key and release when done.

   On the Details panel, notice the **Offset Left** and **Offset Right** values are automatically adjusted to reflect the new position of the moved object/s.

Copy and Paste Objects on a Layout

You can duplicate object/s by copy/pasting them. Once copied, you can paste the duplicate in the desired location within the layout. In this way, you can create an identical copy of the object/s. This action allows you to easily create multiple instances of the same object without manually recreating it from scratch. Duplicates can be modified independently.

Page Building Tools

Use these tools to design visually appealing application pages.

Tool	Description
Line Connector On/Off	Activates or deactivates the line connector. Use the line connector tool to connect and draw a relationship between two plug-in objects on the page. See Line Connector *(on page 1530)*.
Bring Front	When objects overlap on the page, brings the selected object to the front.
Send Back	When objects overlap on the page, sends the selected object to the back.
Group	Groups two or more selected objects on the page.
Un Group	Ungroups a grouped object.
Horizontal Flip	Turns the object to create its mirror image.
Vertical Flip	Turns the object upside-down.
Align Horizontally Center	Horizontally aligns all the objects towards the center of the page.
Align Vertically Center	Vertically aligns all the objects towards the center of the page.

Tool	Description
Align Vertically Top	Vertically aligns all the objects towards the top of the page.
Align Vertically Bottom	Vertically aligns all the objects towards the bottom of the page.
Align Left	Aligns all the objects to the left side of the page.
Align Right	Aligns all the objects to the right side of the page.
Distribute Horizontally	Horizontally aligns the selected objects and evenly distributes the space between them.
Distribute Vertically	Vertically aligns the selected objects and evenly distributes the space between them.
Guide On	Shows the guidelines on the page.
Guide Off	Hides the guidelines on the page.
Guide and Snap On	Shows the page guidelines, and object snap points.
Guide and Snap Off	Hides the page guidelines, and object snap points.

Line Connector

A line connector is a tool to show a connection between two or more objects.

Place two visual objects next to each other on a page, and draw a line connector to link them. You can draw straight line connectors or angle line connectors to link visual objects. You can use the line connector properties *(on page 1531)* to:

- Customize line connector arrowheads to help explain the direction of the flow from one object to the other.
- Apply varied line styles.
- Add a unique color and thickness to the lines.

Draw Line Connector

To draw a line connector, follow these steps:

1. On the page designer toolbar *(on page 1529)*, select  to activate the line connector.
2. Single-click/mouse-click on the page where you want to draw.

3. Start to draw the line by dragging the mouse in the direction you want the line to go. To add a vertex in line, single-click.
4. To end the line connector, Shift-click. (On the keyboard, hold down the `Shift` key and release the mouse-click.)
5. To deactivate the line connector, select  on the page designer toolbar *(on page 1529)*.

Add Vertex

A vertex is a node/point on the line connector. You can add a vertex on the line connector to help demonstrate the relationships between multiple objects. To add a vertex to any line connector:

1. Select the line connector, for which you want to add a vertex.
2. Double-click to select the area on the line connector where you want to add a vertex.
3. Drag the vertex to create an angle.

Delete Line Connector

To delete a line connector:

1. Select the line connector you want to delete.
2. Select  that appears next to the line connector. You can also select the `Delete` key on the keyboard to delete the line connector.

Line Connector Properties

Property	Description
Color	Use the color palette to apply a color to the line.
Width	Enter a width to set the thickness of the line.
Stroke Type	Define how you want the line to appear: • `solid`: Creates a solid line. • `dots`: Creates a dotted line. • `dashes`: Creates a dashed line.
Start Marker End Marker	Define a start/end line marker from these options: • `smallArrowMarker`: Adds a small-sized arrowhead. • `mediumArrowMarker`: Adds a medium-sized arrowhead.

Property	Description
	• `largeArrowMarker`: Adds a large-sized arrowhead. • `vertexMarker`: Adds a circle. • `none`: No line marker is added.
Middle Marker	Define a line marker for the points in the middle of the line: • `circle`: Adds a circle. • `none`: No line marker is added.
Layer	These layers are defined for line connectors so that they appear either above or behind the plug-ins in the end application. • `back`: The line connector is sent to the back, when overlapped by any object on the page. • `front`: The line connector is brought to the front, when overlapped by any object on the page.
Rounded Corners	Select this check box if you want a round corner instead of a pointed corner.

Details Panel

This topic provides an overview of the details panel in the Operations Hub new layout.

All the properties/settings specific to your current selection appear on the details panel.

- Access application settings.
- Access page settings.
- You can modify and save plug-in properties.
- Select source/target data. See Bind Your Data to Plug-ins *(on page 1532)*.
- Access animation properties in the SVG editor mode.

For a high-level panel layout, see Panels Layout *(on page 1510)*.

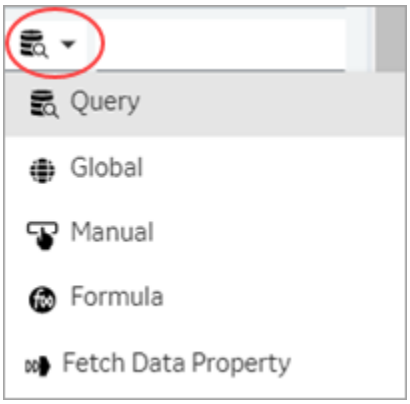
Bind Your Data to Plug-ins

This topic describes the available options to configure source and target data.

In Operations Hub, you can select from the following options to pass values to the plug-in from your data source. You can also specify a target data source to receive data from a plug-in.

- Query *(on page 1533)*
- Global *(on page 1534)*
- Manual *(on page 1534)*
- Formula *(on page 1534)*
- Fetch Data Property *(on page 1534)*

On the plug-in's details panel, you can choose the options from a drop-down menu.



Query

When using a query to configure ***source data***, select at least one output field.

Alias	Option to enter a temporary name for the query's output field.
Output Field	Lists all the data fields available in the selected query. On executing the query, data is retrieved from the data source for the selected output fields. For example, a weather application might use a query to retrieve the current temperature, humidity, and precipitation levels for a particular location, and use these fields as the basis for its output.
+Add	To include additional query output fields, select this option.
+Add All	If you want to include all the query output fields, then select this option.

When using a query to configure ***target data***, select at least one input field.

Input Field	Lists all the data fields available in the selected query. The selected input fields are used to execute the query to retrieve data.

	For example, a weather application might include input fields where you can specify the location, temperature unit, or forecast duration.
+Add	To include additional query input fields, select this option.

Global

This option allows you to select a global variable to configure source data and target data.

Manual

This option allows you to manually enter the values for the plug-in. You can also access enhanced preview *(on page 1517)* of the real-time data within the page designer. The plug-in preview is the same as the result that appears in the end application.

Formula

Select **Add Formula** to create a formula that returns values for the plug-in.

Fetch Data Property

This option is view-only. It applies when you drag-and-drop tag data on a plug-in. The drag-and-drop action automatically fetches the data from the data source, and updates values to a list of applicable properties.

On drag-and-drop, the **Fetch Data Property** label appears for:

- Minimum and Maximum scale values
- Engineering unit
- Data range values

In case you drag-and-drop multiple tags on a plug-in, then values fetched from the first tag are applicable to the above listed properties.

Page Grid Details

This topic describes the page grid properties.

A page is divided into grids, wherein multiple card layouts can be added. Select outside of the card layout to access the page's grid properties. By default, the page grid has 12 rows and 12 columns.

Properties

Field Name	Description
Grid Type	Choose from these grid types: • `fit`: The grid fits to the size of the available space irrespective of the specified number of rows and columns. • `fixed`: This is the default option. The grid appears in a fixed size based on the specified number of column and rows. • `verticalFixed`: The grid's row height is fixed. Column width is adjustable to fit to the size of the available space. • `horizontalFixed`: The grid's column width is fixed. Row height is adjustable to fit to the size of the available space.
Mobile Breakpoint	This value determines the page grid layout adjustment on a mobile device.
Margin	This value determines the size of the gap between the rows and columns.
Display Grid	Choose how you want to display the grid on the page: • `always`: Shows the grid lines on the page. • `onDrag&Resize`: Allows to drag and resize grid columns and rows. • `none`: Hides the grid lines on the page.
Fixed Col Width	Appears when **Grid Type** is `fixed` and `horizontalFixed`. Enter a value to set a fixed width for the grid columns.
Fixed Row Height	Appears when **Grid Type** is `fixed` and `verticalFixed`. Enter a value to set a fixed width for the grid rows.
Min Cols	Appears when **Grid Type** is `fit` and `verticalFixed`. Enter a value to set minimum width for the grid columns.
Max Cols	Appears when **Grid Type** is `fit` and `verticalFixed`. Enter a value to set maximum width for the grid columns.
Min Rows	Appears when **Grid Type** is `fit` and `horizontalFixed`. Enter a value to set minimum width for the grid rows.
Max Rows	Appears when **Grid Type** is `fit` and `horizontalFixed`.

Field Name	Description
	Enter a value to set maximum width for the grid rows.
Row Height Ratio	Appears when **Grid Type** is `fit`.
Outer Margin	Appears when **Grid Type** is `fit`, `verticalFixed`, and `horizontalFixed`.

Flexbox Card

This layout offers a flexible and responsive design structure.

A flexbox card aligns and distributes the items along a main axis. Objects placed within a flexbox card are laid out next to each other, row-wise or column-wise. When we drag and drop plug-in objects, they get rearranged to follow the one-dimensional layout concept.

The ideal way to use a flexbox card is when you have objects that require flexibility to grow and shrink, and fit within the layout. Use the flexbox properties to control the alignment and distribution of the objects (items).

Flexbox Properties

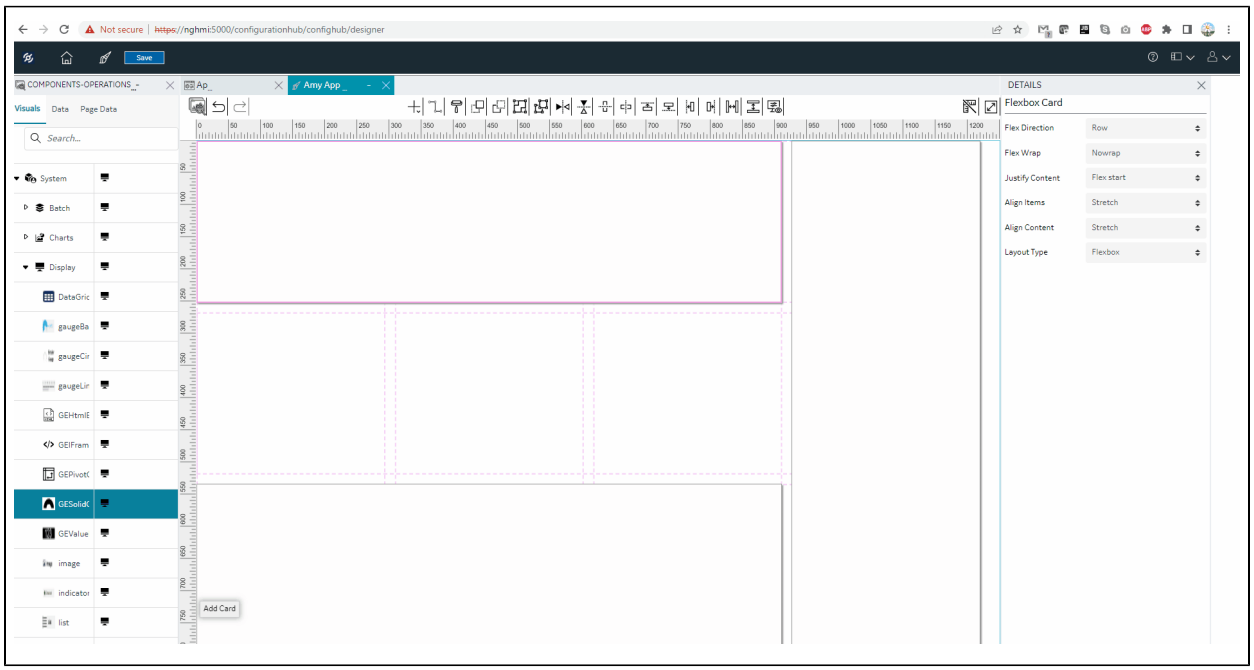
Field Name	Description
Columns	The card occupies the specified number of columns on the page grid *(on page 1534)*.
Rows	The card occupies the specified number of rows on the page grid *(on page 1534)*.
Position X	Applies to the horizontal placement of the card on the page. When the value is `0`, the card is placed on the left-most side of the page. As you increase the value, the card moves away from the left side of the page.
Position Y	Applies to the vertical placement of the card on the page. When the value is `0`, the card is placed at the top of the page. As you increase the value, the card moves away from the top of the page.
Flex Direction	The objects are arranged next to each other based on these placement directions:

Field Name	Description
	• `Row`: The objects within the card are placed horizontally, from left to the right. • `Column`: The objects within the card are placed vertically, from top to bottom. • `Row reverse`: The objects within the card are placed horizontally, from right to left. • `Column reverse`: The objects within the card are placed vertically, from bottom to top. See Flex Row *(on page 1539)*, Flex Row and Column *(on page 1540)*.
Flex Wrap	By default, objects within the card are not wrapped. • `Nowrap`: All the objects within the card try to fit into a single line, as per the flex direction. • `Wrap`: The objects are evenly spaced, and are arranged in multiple lines, as per the flex direction. The wrap orientation is from top to bottom. • `Wrap reverse`: The objects are evenly spaced, and are arranged in multiple lines, as per the flex direction. The wrap orientation is from bottom to top. See Flex Wrap *(on page 1540)*.
Justify Content	You can choose from these options to align objects along the main axis (left to right): • `Flex start`: Objects are pushed towards the start of the direction (left). • `Flex end`: Objects are pushed towards the end of the direction (right). • `Center`: Objects are pushed towards the center of the direction (horizontal center). • `Space between`: Objects are evenly spaced on a single line. • `Space around`: Objects are evenly spaced on a single line, with equal amount of space around them.
Align Items	You can choose from these options to align objects along the cross axis (top to bottom):

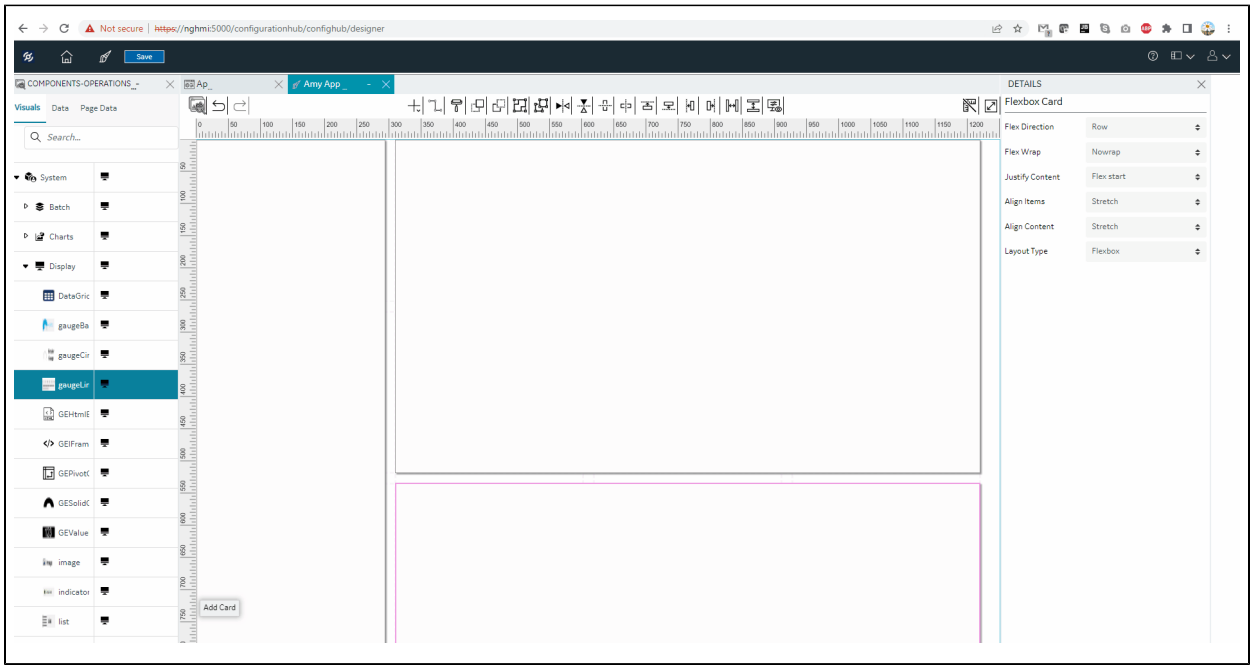
Field Name	Description
	• `Flex start`: Objects are pushed towards the start of the direction (top). • `Flex end`: Objects are pushed towards the end of the direction (bottom). • `Center`: Objects are pushed towards the center of the direction (vertical center). • `Baseline`: Objects choose a baseline (for example, title of the object) and align accordingly. • `Stretch`: Objects stretch to fill the card.
Layout Type	Choose from the following card layouts before starting to design your pages: • `Coordinate`: Objects dropped on this layout stay where they are on the page. See Coordinate Card *(on page 1541)*. • `Flexbox`: Objects dropped on this layout are automatically arranged on a single line.
Flex Grow	Enter a value for the object to grow in size with the flexbox layout. The value determines how much the object will grow in comparison to other objects within the layout.
Flex Shrink	Enter a value for the object to shrink in size with the flexbox layout. The value determines how much the object will shrink in comparison to other objects within the layout.
Flex Basis	This default property is the initial size of the objects within the flexbox layout. You can grow/shrink this size.
Style	Select these check boxes to format the objects: • `Rounded Corners`: Adds a rounded corner instead of a pointed corner. • `Custom Colors`: Adds color.
Function	Layout functionalities:

Field Name	Description
	• `Card`: This is the regular flexbox layout option without any additional functionalities. • `Interactive Map`: This flexbox layout includes an interactive map functionality. See Interactive Map *(on page 1542)*. • `Repeater`: This flexbox layout includes a repeater functionality. You can create multiple instances of a plug-in dropped in a repeater layout. Refer to Repeater *(on page 1545)* layout properties.
Show/Hide	Select **+Add Conditions** to create conditions to show or hide the card.

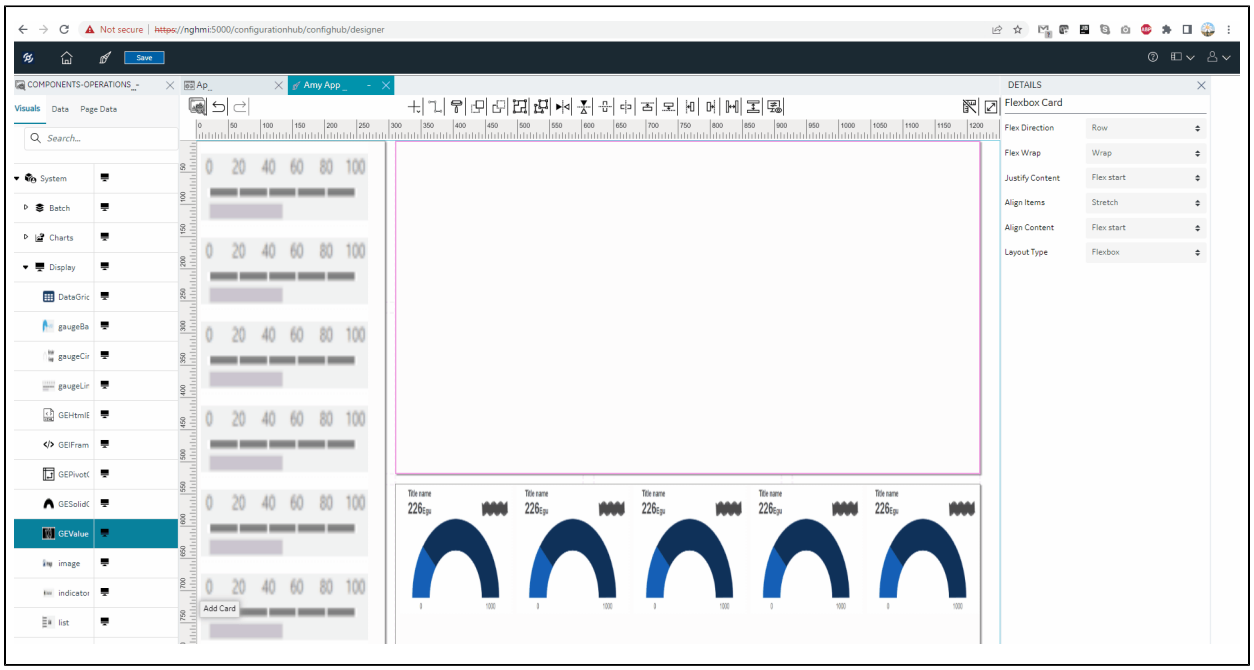
Flex Row



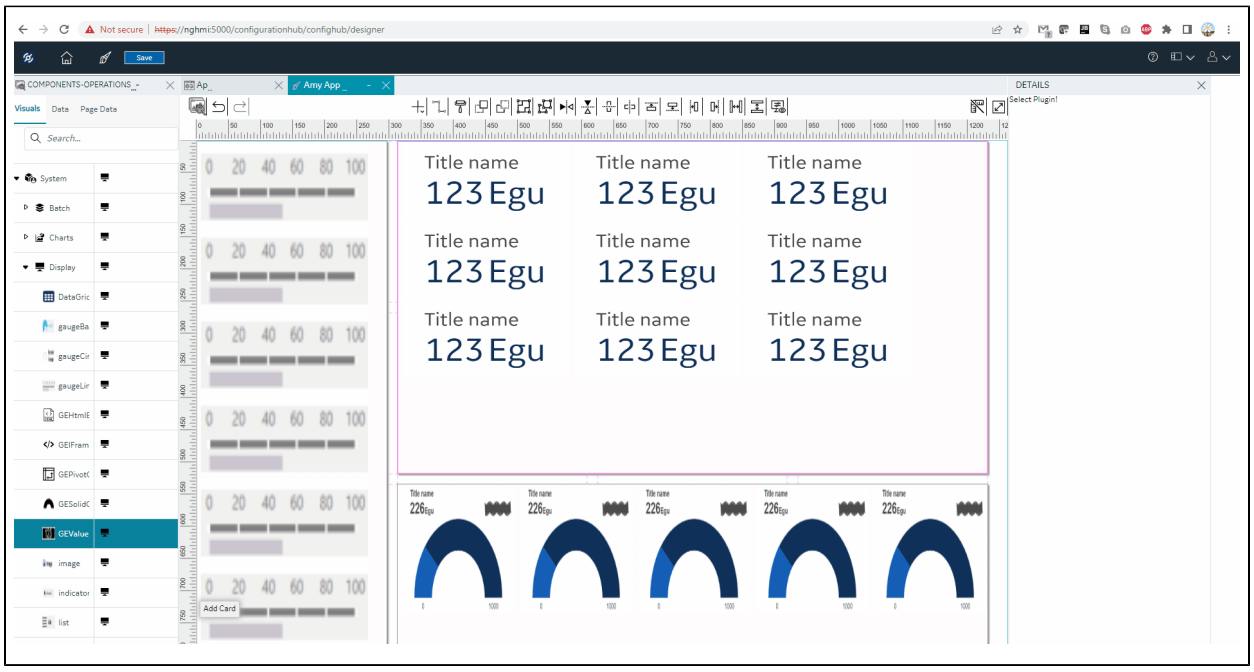
Flex Row and Column



Flex Wrap



Resizing the Flexbox Layout



Coordinate Card

This layout offers an absolute layout design structure.

This is the default card layout when you start to design application pages. You can drag and drop plug-in objects to an absolute position on the card. The end application reflects the same as in the coordinate card page design.

Field Name	Description
Columns	The card occupies the specified number of columns on the page grid *(on page 1534)*.
Rows	The card occupies the specified number of rows on the page grid *(on page 1534)*.
Position X	Applies to the horizontal placement of the card on the page. When the value is `0`, the card is placed on the left-most side of the page. As you increase the value, the card moves away from the left side of the page.
Position Y	Applies to the vertical placement of the card on the page. When the value is `0`, the card is placed at the top of the page. As you increase the value, the card moves away from the top of the page.
Layout Type	Choose from the following card layouts before starting to design your pages:

Field Name	Description
	• `Coordinate`: Objects dropped on this layout stay where they are on the page. • `Flexbox`: Objects dropped on this layout are automatically arranged on a single line. See Flexbox Card *(on page 1536)*.
Style	Select these check boxes to format the objects: • `Rounded Corners`: Adds a rounded corner instead of a pointed corner. • `Custom Colors`: Adds color.
Function	Layout functionalities: • `Card`: This is the regular flexbox layout option without any additional functionalities. • `Interactive Map`: This flexbox layout includes an interactive map functionality. See Interactive Map *(on page 1542)*.
scale Line Connector	**Scale Line Connectors** checkbox option: - We need to set 'Scale Line' connector option at card level and with this setting the line connector will work similar to %. All the other plugins that are connected using line connector needs to be in % when user is expecting to scale based on br*oswer page dynamic height and width changes.
Show/Hide	Select **+Add Conditions** to create conditions to show or hide the card.

Scroll bars will display for the card when card size is smaller than the plugin size.

Value display: - In new designer, Height & width will consider from widget properties not from the plugin manifest/properties (Height & Width).

Breadcrumb: - Breadcrumb combination with any other plugins used in coordinated layout , should follow the higher z-index properties than breadcrumb. (Ex: Set the Breadcrumb z-index '0' and Alarm Card/Trend card should be z-index '1')

Interactive Map

This topic describes properties for an interactive map layout.

The interactive map functionality is available in both coordinate and flexbox card layout types.

1. Upload an image.
2. Double-click the image areas where you want to create a marker.
3. Select the marker you want to update.
4. On the details panel, select **+Add Marker State**, and update the properties.
5. Similarly update all markers on the image.
6. You can also delete markers on the image.

If you selected an interactive map functionality for your layouts, then configure these details:

Field Name	Description
Map Image	Select **Upload Image** to browse and select an image. The option to upload an image is also available within the interactive map card layout.
Coordinates	Enter these coordinates to position the image within the card. The value should be less than or equal to 99. • **Top Offset**: The margin between the top of the card and top of the image. • **Left Side Offset**: The margin between the left side of the card and left side of the image. You can also set the coordinates by moving the image on the layout. The values in the text box are adjusted based on the set position.
Marker Type	You can select one of the following options: • **Shape** • **Image**
Color	If you selected **Shape** as the marker type, specify a fill color.
Shape	If you selected **Shape** as the marker type, select one of the following options: • `Round` • `Square`
Marker Image	If you selected **Image** as the marker type, upload an image for the marker. For example, if the marker identifies the position of a radiator fan, you can upload the image of a fan instead of using a predefined round or square shape for the marker.

Field Name	Description
Size	Enter the size to multiply the default size of the marker shape or image size. For example, if you enter 2, the marker size is double the default size. By default, the value in this field is 1. The marker size can have a value greater than or equal to 100.
Label	If you want a label to appear for the marker, then enter the label name.
Label Color	Choose a color for the label text.
Data Label	You can choose to pass the data to the interactive map using a query, global, formula, or enter the value manually. For example, suppose the interactive map plots the temperature of various components of a car. For a marker that identifies the position of a radiator fan in a car, you can map the data label with the output of the query that retrieves the temperature of the fan. When you access the application, the temperature value retrieved from the query is displayed for the radiator fan.
Number Format	• **Use Raw Format**: Select the check box to display numbers in raw format. For example, a numeric value with 5 or more decimal places is shown as it is, and not rounded off. • **Number of decimals**: This option appears if you do not want to display numbers in raw format. In that case, enter the decimal places (0-7) to consider after the decimal point to format large numbers. Based on the decimals, the value is rounded off to the nearest whole number.
Data Label Color	Identifies the color and opacity of the data label.
Show/Hide	Select **+Add Conditions** to create conditions that show or hide the interactive map.
BEHAVIOR	You can set actions to be performed when a marker is selected. 1. Select **+Add**. 2. Select from the list of available actions for the marker.
Delete Marker	Select the marker you want to delete, and select the **Delete** icon.

Repeater

A repeater layout displays a set of repeating objects.

The repeater functionality is available only in the flexbox card layout.

If you selected a repeater functionality for your flex layout *(on page 1536)*, then configure these details:

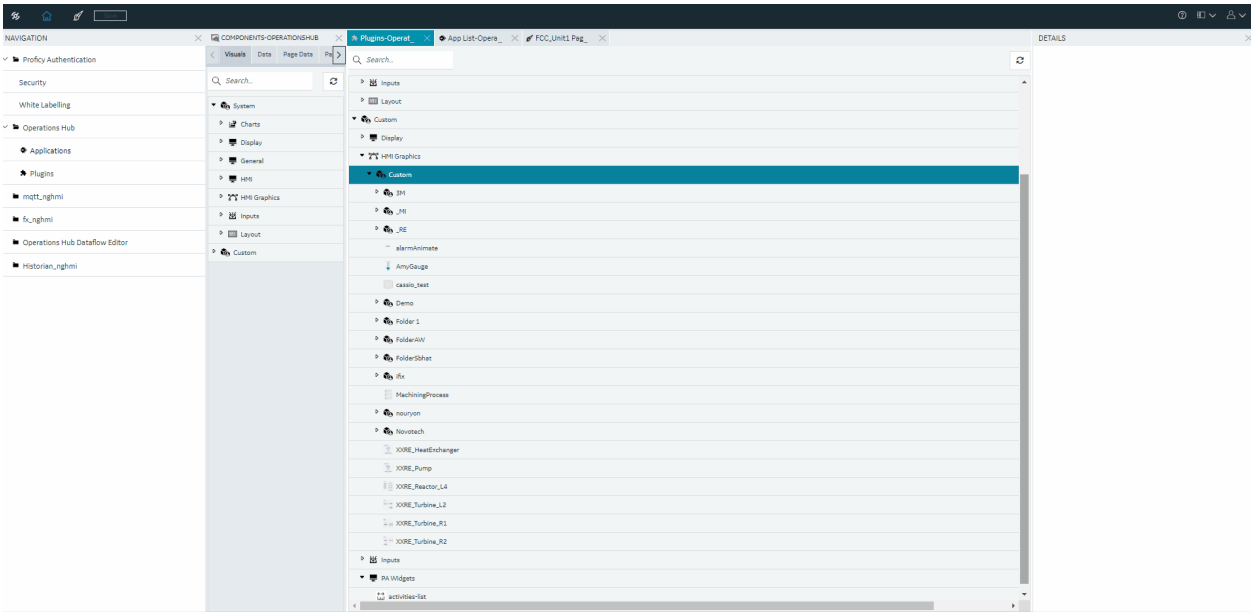
Field Name	Description
Repeater Source	Select a query to retrieve data, which is displayed in the repeater.
Multi Select	This property is used in combination with a map or a graph plug-in. Select this check box if you want to insert a check box for multi-selection. In the end application, a check box appears in each row of the repeater, allowing you to select which items should appear on the map or the graph.
Checked	This property applies only if you enabled multi-selection check boxes. Select this check box if you want multi-selection check boxes selected by default. When you open the end application, the check box that appears in each row of the repeater remains selected by default.
Load	Select this check box if you want to add rows that appear by default in the repeater.
Page Size	Enter the number of rows that should appear by default in the repeater.
Paging Style	Choose from these options: • `Paging`: Each page in the repeater will contain the number of rows that you specify. You can navigate to the other pages to access the rest of the rows. • `Load More`: The repeater will initially contain the number of rows that you specify. A **Load more** button appears in the application, which allows you to retrieve additional rows in the same page.

HMI Graphics

About HMI Graphics

HMI graphics are accessible only in the latest version of Operations Hub layout.

Use the HMI graphic plug-ins to design a pictorial setup of your industrial system. The plug-ins can be animated based on their configured tag data values. Operators can experience a real world layout while monitoring the changing status of the system. The HMI graphics are scalable, and can be resized to fit into your application design.



The following table provides an overview on how to get started with HMI graphics.

#	Task	Description
1	Create categories to efficiently organize your HMI graphics.	Refer to these topics: • Create Category *(on page 1555)* • Rename Category *(on page 1555)* • Delete Category *(on page 1556)*
2	With the Operations Hub installation, you get a list of out-of-the-box HMI Graphics *(on page 1520)* (not available in Operations Hub Classic). You can use the system HMI graphics to get started,	Refer to these topics: • Create New Graphic *(on page 1548)* • Duplicate Graphic *(on page 1548)* • Edit Graphic *(on page 1550)*

#	Task	Description
	and create custom graphics for varied applications.	• Rename Graphic *(on page 1550)* • Delete Graphic *(on page 1554)*
3	Distribute HMI graphics across different Operations Hub systems using the export/import feature.	Refer to these topics: • Export Graphic *(on page 1552)* • Import Graphic *(on page 1553)*
4	Use the editor to design and manipulate Scalable Vector Graphics (SVG) elements. In the Graphics Editor, you can draw, modify, and arrange the SVG objects to create visual elements for your applications.	Refer to SVG Editor Tools *(on page 1566)*
5	Create data items and integrate them into the graphics, such as text or images, and apply animations to create dynamic visual effects.	Refer to these topics: • Create Data Item *(on page 1557)* • Add Datalink Animation *(on page 1558)* • Add Color Animation *(on page 1560)* • Add Fill Animation *(on page 1562)* • Add Visibility Animation *(on page 1564)* • Delete Animation *(on page 1565)*

Add/Update Graphics to a Page

When designing application pages in Operations Hub, you can drag-and-drop graphics to the page designer area.

In case you modified animation for a graphic that is already used in an application, then you need to update those graphic instances to render the data accurately. For example, to update an instance of a graphic called `speedometer`, do the following:

1. Open the application page where the `speedometer` is used.
2. Delete the `speedometer`. You have deleted the old instance of the `speedometer`.
3. On the **Visuals** tab under custom graphics, drag-and-drop or double-click the `speedometer` to add it back to the page. You have added the updated instance of the `speedometer`.
4. On the toolbar, select **Save**.

You don't need to update graphic instances if you modified color, size, position, or shape of a graphic.

Duplicate Graphic

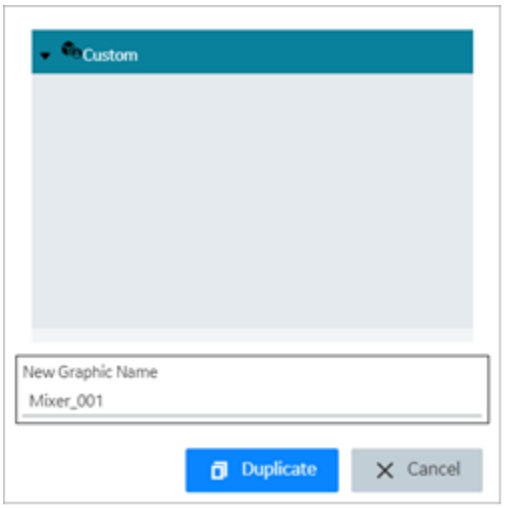
This topic describes how to duplicate and create a new HMI graphic.

You cannot create a graphic with duplicate names in the same folder.

1. You can duplicate all HMI graphics under system and custom.

Go to **System > HMI Graphics > High Performance**.
Go to **Custom > HMI Graphics**

   A list of HMI graphics appear.
2. Right-click the graphic you want to duplicate, and select **Duplicate Graphic**.
   A pop-up screen appears.
3. Do the following:
   a. Select a custom location path to save the new graphic.
   b. Enter a new name for the graphic.
   c. Select **Duplicate**.



You can access the newly created graphic under the custom plug-ins category.

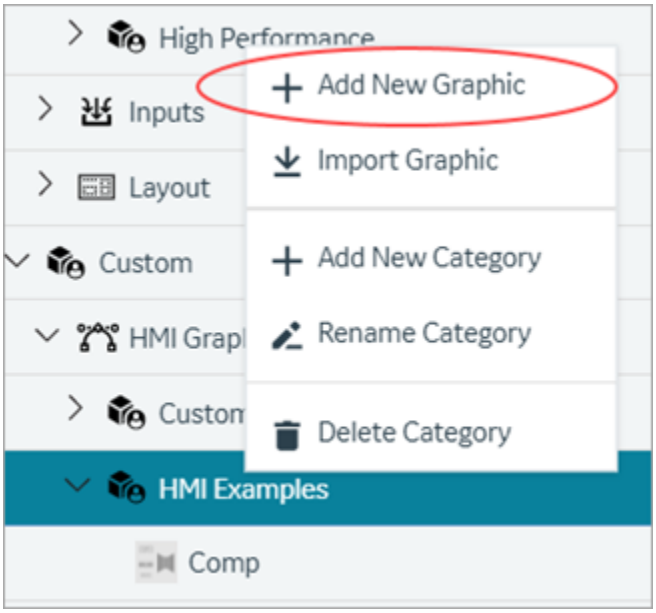
Create New Graphic

This topic describes how to create a new HMI graphic.

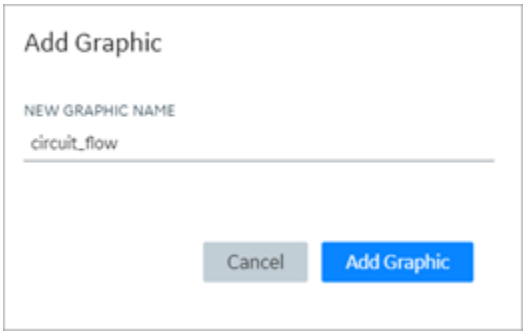
Using the SVG editor, you can create new HMI graphics from scratch apart from duplicating existing graphics *(on page 1548)*.

The following steps create a new SVG file. You can open the file in the editor to create interactive elements of an HMI graphic using the basic shapes, lines, etc.

1. Under custom graphics, select the folder category where you want to create and save the new graphic.
2. Right-click the folder and select **Add New Graphic**.



   The **Add Graphic** screen appears.
3. Enter a name for the new graphic.
4. Select **Add Graphic**.



   A blank SVG file is created with the name.

The newly created file is saved to the selected folder category.

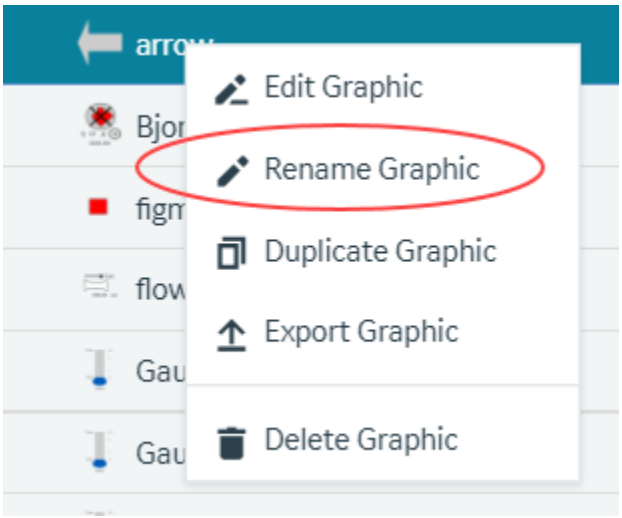
1. Use the edit option *(on page 1550)* to open the file in the SVG editor.
2. Use the SVG editor tools *(on page 1566)* to create HMI graphics.

Rename Graphic

This topic describes how to rename a newly created HMI graphic plug-in.

Duplicate Graphic *(on page 1548)*

1. Under **Custom** plug-ins, right-click the graphic you want to rename.
2. Select **Rename Graphic**.



   A confirmation dialog appears.
3. Enter a new name for the graphic.
4. Select **Rename** to save.

The graphic is updated with a new name.

Edit Graphic

This topic describes how to modify a HMI graphic plug-in.

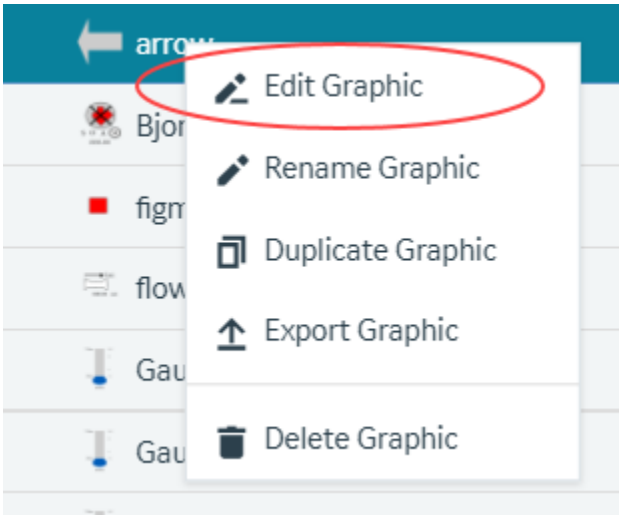
You can modify custom HMI graphics only.

Note:
Modifying graphic templates in an application affect the rendering of data and animations in the runtime environment. You need to manually replace the instances of the graphic template with its latest version in all affected pages. Refer to the table:

Graphic Template Modifications	What To Do
Added new animation	Update graphic instances to see the new animations.

Graphic Template Modifications	What To Do
Deleted existing animation	Update graphic instances to reflect the changes.
Modified visual elements (adding shapes, changing colors, etc.)	No manual action required. Changes are automatically recognized by graphic instances in the runtime.

1. Under **Custom** plug-ins, right-click the graphic you want to modify.
2. Select **Edit Graphic**.



The graphic opens in an SVG editor.

3. On the components panel, access the following tabs to modify the graphic:

Graphic Tree	On this tab, you can view the hierarchy of SVG elements and corresponding animations. You can add or delete animations from this tree only. Refer to the following topics: ◦ Add Datalink Animation *(on page 1558)* ◦ Add Color Animation *(on page 1560)* ◦ Add Fill Animation *(on page 1562)* ◦ Add Visibility Animation *(on page 1564)* ◦ Delete Animation *(on page 1565)*
Graphics List	On this tab, you can access all the plug-ins listed under the custom category. Refer to the following topics:

	◦ Create Category *(on page 1555)* ◦ Rename Category *(on page 1555)* ◦ Delete Category *(on page 1556)*

4. Save the changes made to the graphic.

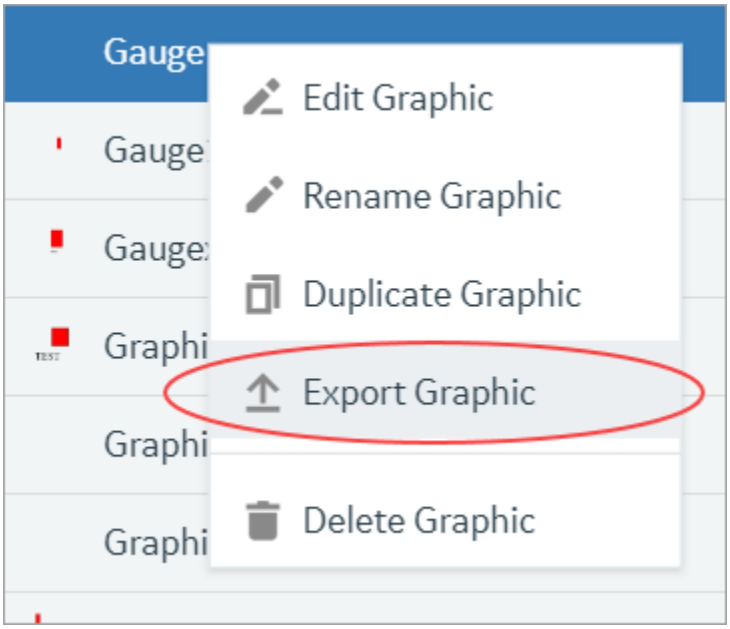
Export Graphic

This topic describes how to export a HMI graphic.

You can export and save graphics to re-use them across different systems. For example, a system integrator builds a valve graphic and implements it for various customers.

To import/export SVGs, refer to SVG Editor Tools *(on page 1566)*.

1. Under **Custom** plug-ins, right-click the graphic you want to export.
2. Select **Export Graphic**.



The export graphic screen appears.

3. Select **Export**.

The file is exported and saved as a JSON file.

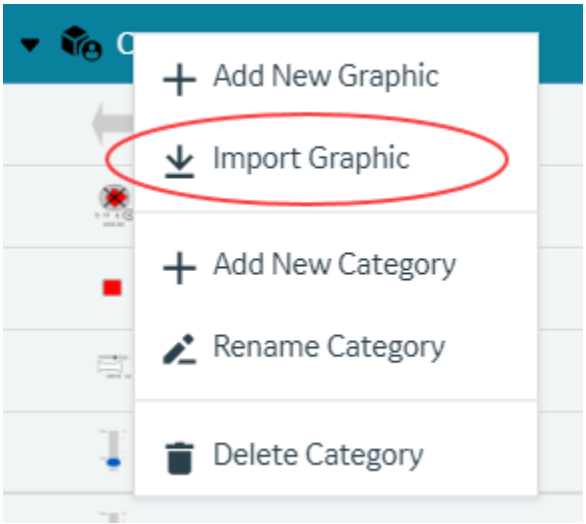
Import Graphic

This topic describes how to import a HMI graphic.

HMI graphics are a combination of SVGs (visual shapes/text, etc.) and animated content stored in a JSON file. This file can be distributed across different Operations Hub systems using the export/import feature. Invalid JSON files will not get imported to Operations Hub.

To import/export SVGs, refer to SVG Editor Tools *(on page 1566)*.

1. Under **Custom** plug-ins, right-click the folder where you want to import a graphic.
2. Select **Import Graphic**.



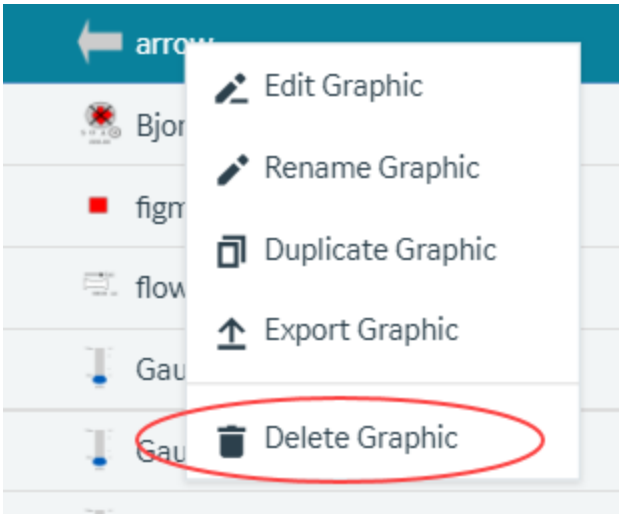
3. Browse the system and locate the JSON file you want to import.
4. Select **Import**.

The file is imported to the folder.

Delete Graphic

This topic describes how to delete a HMI graphic plug-in.

1. Under **Custom** plug-ins, right-click the graphic you want to delete.
2. Select **Delete Graphic**.



A confirm dialog appears.

3. Select **Yes**

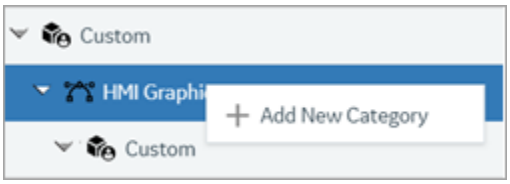
The graphic is deleted from Operations Hub.

Create Category

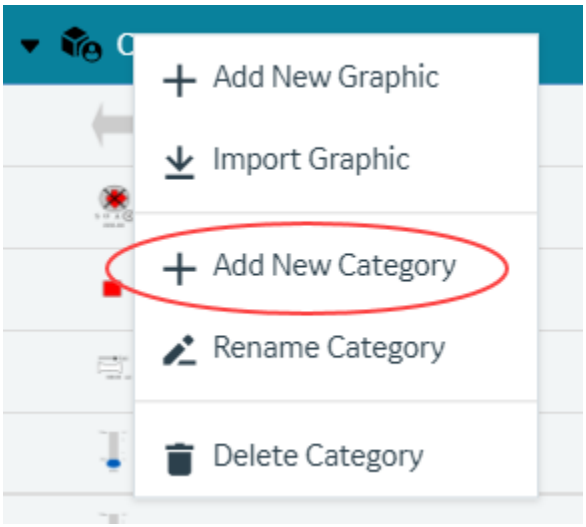
This topic describes how to create folders and sub-folders to categorize custom graphics.

You can also create categories on the components panel while editing graphics *(on page 1550)*.

1. To create a category for the first time under **Custom**, right-click **HMI Graphics** and select **Add New Category**.



   Hereafter, you can create categories at every level. Right-click the folder where you want to create a category and select **Add New Category**.



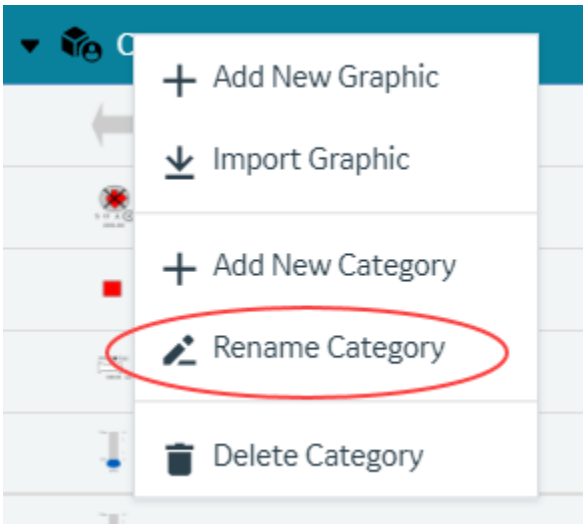
   The **Add Category** screen appears.
2. Enter a name for the new category.
3. Select **Add Category**.
   A folder with the given name is created.

Rename Category

This topic describes how to rename the folder categories.

Create Category *(on page 1555)*

1. Right-click the folder you want to rename and select **Rename Category**.



   A screen appears with the current folder name.
2. Enter a new name and select **Rename**.
   The folder category is saved with the new name.

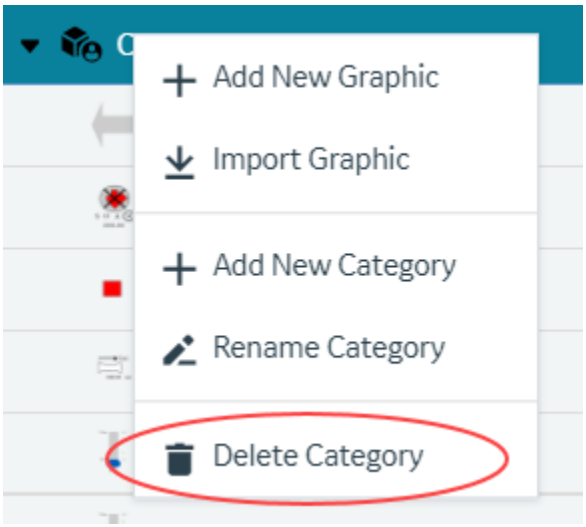
Delete Category

This topic describes how to delete the folder categories.

Create Category *(on page 1555)*

If you want to delete any custom folder/sub-folder, first delete the graphics within the folder.

1. Right-click the folder you want to delete and select **Delete Category**.



A confirmation screen to confirm the delete action appears.

2. Select **Yes**.

   The folder category is deleted.

Create Data Item

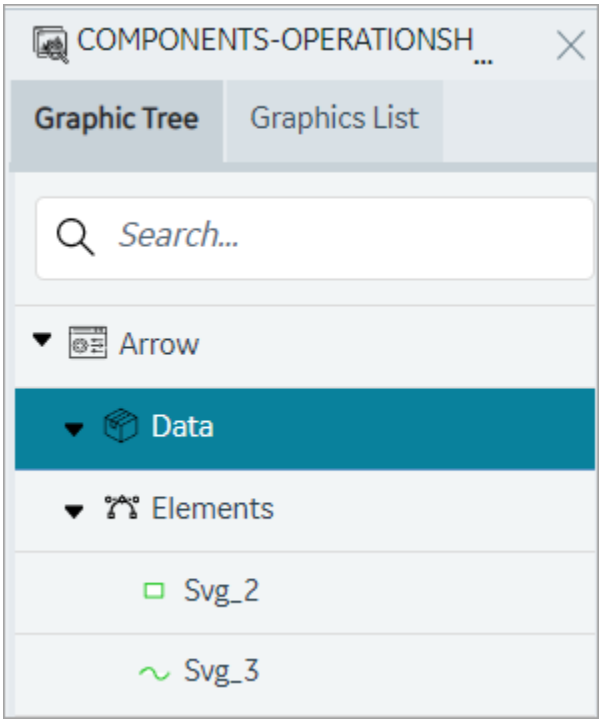
This topic describes how to create data items for SVG graphics.

Data items are used to configure SVG graphic properties. You can create only one data item for each graphic. By default, every graphic has a data item attached to it. You can modify or delete the default data item. In the following steps, you can create a data item in case you deleted the default data item.

1. Open a graphic in the SVG editor.

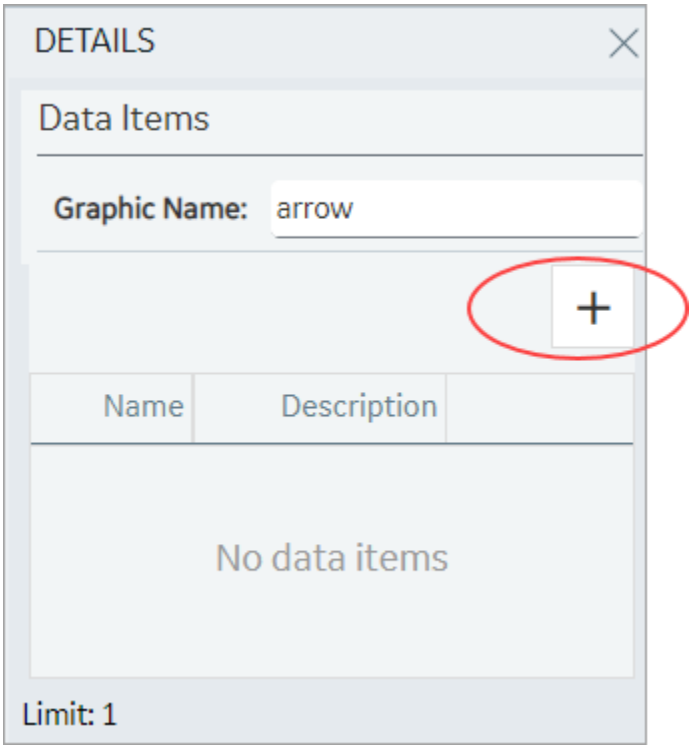
   Refer to Edit Graphic *(on page 1550)*.

2. On the components panel > **Graphic Tree** tab, select **Data**.



   Data Items appears on the details panel.

3. Select **+** icon.



4. Enter a **Name** and **Description** for the data item.
5. Select **Update**.

The data item is created with options to modify and delete the item.

Add Datalink Animation

This topic describes how to animate text for SVG graphics.

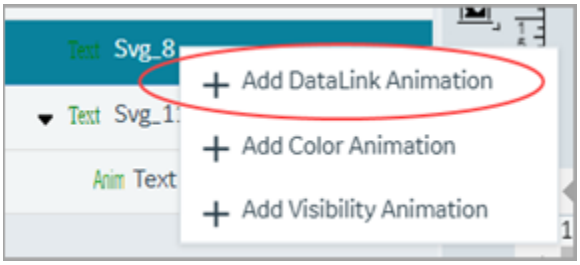
In SVG, you can create text elements and animate them. You can also use input data to create dynamic and interactive animations by linking data to the animation properties. At runtime, the animation is executed based on the data. For example, change in color of an element based on data values.

Note:
Modifying graphic templates in an application affect the rendering of data and animations in the runtime environment. You need to manually replace the instances of the graphic template with its latest version in all affected pages. Refer to the table:

Graphic Template Modifications	What To Do
Added new animation	Update graphic instances to see the new animations.
Deleted existing animation	Update graphic instances to reflect the changes.

Graphic Template Modifications	What To Do
Modified visual elements (adding shapes, changing colors, etc.)	No manual action required. Changes are automatically recognized by graphic instances in the runtime.

1. Right-click the element you want to animate.
2. Select **Add DataLink Animation**.



   Adds an entry for text animation under the element.
3. On the Details panel, access the text animation properties for the entry.
4. Enter information in the following fields:

Field Name	Description
Animation Name	Provide a name for reference.
Data Type	Choose from these data types to configure animation properties: ◦ `Text` ◦ `Decimal` ◦ `Integer`
Data Item	Select the data item you want to apply to the element. See Create Data Item *(on page 1557)*.
Attribute	The drop-down list contains several attributes, which can be associated with the data item in order to animate the HMI Graphic. The animation will apply to the selected attribute.
Default Value	Enter a default value for the selected attribute. This default value is used only when the data source is set to **Manual** in page designer. See Bind Your Data to Plug-ins *(on page 1532)*.
Zero Fill	Select this check box if you want to fill unused digits with zeroes.

Field Name	Description
	For example, if the graphic can display a maximum of four digits and the current value is 25, it is displayed as "0025" when zero fill is enabled.
Integer Digits	If **Zero Fill** is enabled, enter the number of digits for display.
Group Digits	Select this check box if you want to group the digits in a graphic display making it easy to read. For example, 123456 can be grouped as "123,456".
Scientific	Select this check box if you want to display numbers in scientific notation. This option is useful for displaying very large numbers in a more compact and readable format.
Decimal Digits	Enter the number of decimal places to display a number. This option helps to avoid displaying unnecessary decimal places or rounding errors.

5. On the toolbar, select **Save**.

Add Color Animation

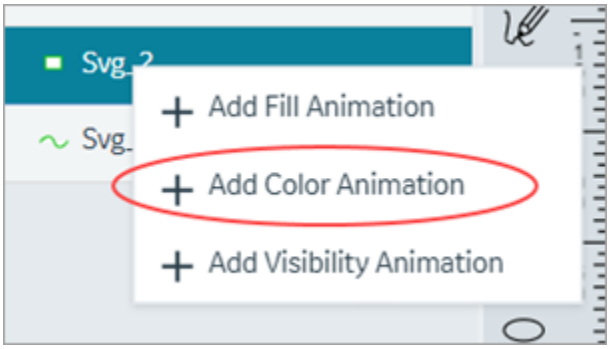
This topic describes how to create color animation for SVG graphics.

You can animate to change the color of the SVG graphic element.

Note:
Modifying graphic templates in an application affect the rendering of data and animations in the runtime environment. You need to manually replace the instances of the graphic template with its latest version in all affected pages. Refer to the table:

Graphic Template Modifications	What To Do
Added new animation	Update graphic instances to see the new animations.
Deleted existing animation	Update graphic instances to reflect the changes.
Modified visual elements (adding shapes, changing colors, etc.)	No manual action required. Changes are automatically recognized by graphic instances in the runtime.

1. Right-click the element you want to animate.
2. Select **Add Color Animation**.



   Adds an entry for color animation under the element.
3. On the Details panel, access the color animation properties for the entry.
4. Enter information in the following fields:

Field Name	Description
Animation Name	Provide a name for reference.
Data Item	Select the data item you want to apply to the element. See Create Data Item *(on page 1557)*.
Attribute	The drop-down list contains several attributes, which can be associated with the data item in order to animate the HMI Graphic. The animation will apply to the selected attribute.
Default Value	Enter a default value for the selected attribute. This default value is used only when the data source is set to **Manual** in page designer. See Bind Your Data to Plug-ins *(on page 1532)*.
Color Table	Configure one or more colors to change the color based on a specific value. To configure a color: a. Select the + icon. b. Select a logical **Operator**. For example, `<` c. Enter a **Value**. For example, `50` d. Choose a **Color**. For example, green. e. Select **Update**. Result: If the value is less than `50`, the color remains green.

Field Name	Description
	Configured colors appear in a table with options to modify and delete the colors. You can also drag-to-reorder the list of colors in a table.

5. On the toolbar, select **Save**.

Add Fill Animation

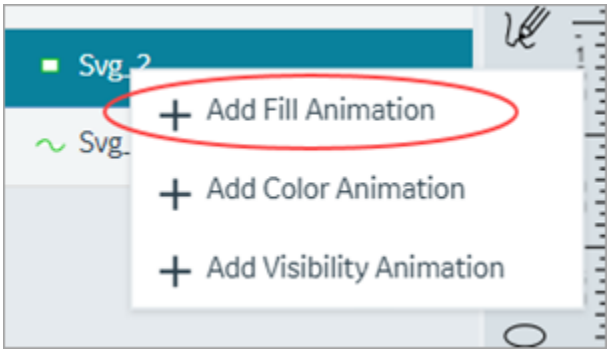
This topic describes how to create fill animation for SVG graphics.

You can animate the fill color of the SVG graphic element.

Note:
Modifying graphic templates in an application affect the rendering of data and animations in the runtime environment. You need to manually replace the instances of the graphic template with its latest version in all affected pages. Refer to the table:

Graphic Template Modifications	What To Do
Added new animation	Update graphic instances to see the new animations.
Deleted existing animation	Update graphic instances to reflect the changes.
Modified visual elements (adding shapes, changing colors, etc.)	No manual action required. Changes are automatically recognized by graphic instances in the runtime.

1. Right-click the element you want to animate.
2. Select **Add Fill Animation**.



Adds an entry for fill animation under the element.

3. On the Details panel, access the fill animation properties for the entry.

4. Enter information in the following fields:

   Need to make distinction between level, min, and max. Each of these three properties have ability to define data item, attribute, and default

Field Name	Description
Animation Name	Provide a name for reference.
Color	Select a color to fill the SVG element. For example, sets the color of the liquid or the substance represented by the SVG tank.
Fill Direction	Select from these directional modes, in which a gauge or pump is filled with data: ◦ `left-to-right` ◦ `right-to-left` ◦ `bottom-to-top` ◦ `top-to-bottom`
Level	The values entered in this section apply to an object's fill-level, such as the progress of a loading bar or the level of a liquid in a container.
Minimum	The values entered in this section apply to minimum values of a range. For example, minimum levels of a gauge.
Maximum	The values entered in this section apply to maximum values of a range. For example, maximum levels of a gauge.
Data Item	Select the data item you want to apply to the element. See Create Data Item *(on page 1557)*.
Attribute	The drop-down list contains several attributes, which can be associated with the data item in order to animate the HMI Graphic. The animation will apply to the selected attribute.
Default Value	Enter a default value for the selected attribute. This default value is used only when the data source is set to **Manual** in page designer. See Bind Your Data to Plug-ins *(on page 1532)*.

5. On the toolbar, select **Save**.

Add Visibility Animation

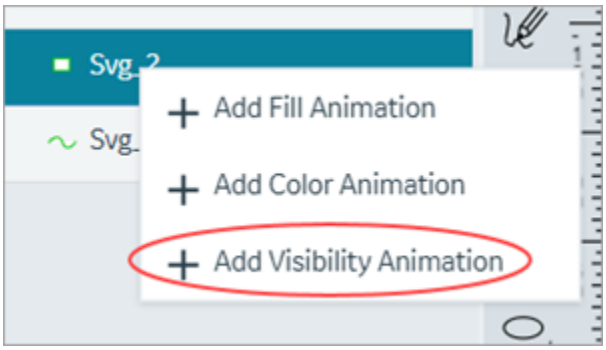
This topic describes how to create visibility animation for SVG graphics.

Lets you control the visibility of graphical elements.

Note:
Modifying graphic templates in an application affect the rendering of data and animations in the runtime environment. You need to manually replace the instances of the graphic template with its latest version in all affected pages. Refer to the table:

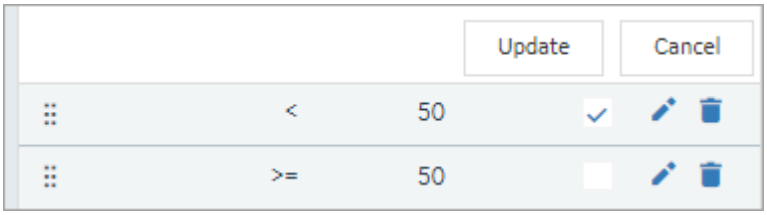
Graphic Template Modifications	What To Do
Added new animation	Update graphic instances to see the new animations.
Deleted existing animation	Update graphic instances to reflect the changes.
Modified visual elements (adding shapes, changing colors, etc.)	No manual action required. Changes are automatically recognized by graphic instances in the runtime.

1. Right-click the element you want to animate.
2. Select **Add Visibility Animation**.



   Adds an entry for visibility animation under the element.
3. On the Details panel, access the visibility animation properties for the entry.
4. Enter information in the following fields:

Field Name	Description
Animation Name	Provide a name for reference.
Data Item	Select the data item you want to apply to the element.

Field Name	Description
	See Create Data Item *(on page 1557)*.
Attribute	The drop-down list contains several attributes, which can be associated with the data item in order to animate the HMI Graphic. The animation will apply to the selected attribute.
Default Value	Enter a default value for the selected attribute. This default value is used only when the data source is set to **Manual** in page designer. See Bind Your Data to Plug-ins *(on page 1532)*.
Visibility Table	Configure one or more values to animate the visibility status of the element. To configure visibility status: a. Select the + icon. b. Select a logical **Operator**. For example, `<` c. Enter a **Value**. For example, `50` d. Select the check box for **Visible**. e. Select **Update**. Similarly, add another value to the table that is `>= 50` with visible check box cleared.  Result: The element is visible only when the value is less than `50`. If the value is greater than or equal to `50`, the element is hidden. The visibility configuration values appear in a table with options to modify and delete them. You can also drag-to-reorder the visibility list.

5. On the toolbar, select **Save**.

Delete Animation

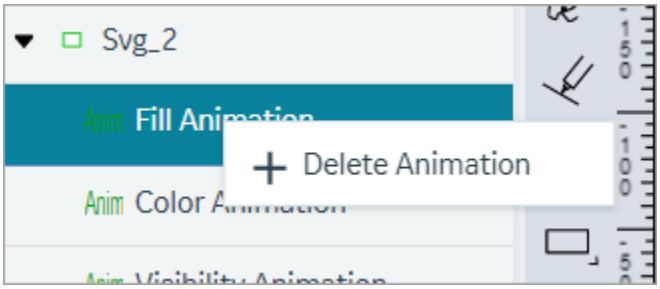
This topic describes how to delete animation for SVG graphics.

You can delete text, color, fill, and visibility animation.

Note:
Modifying graphic templates in an application affect the rendering of data and animations in the runtime environment. You need to manually replace the instances of the graphic template with its latest version in all affected pages. Refer to the table:

Graphic Template Modifications	What To Do
Added new animation	Update graphic instances to see the new animations.
Deleted existing animation	Update graphic instances to reflect the changes.
Modified visual elements (adding shapes, changing colors, etc.)	No manual action required. Changes are automatically recognized by graphic instances in the runtime.

1. Right-click the animation you want to delete.
2. Select **Delete Animation**.



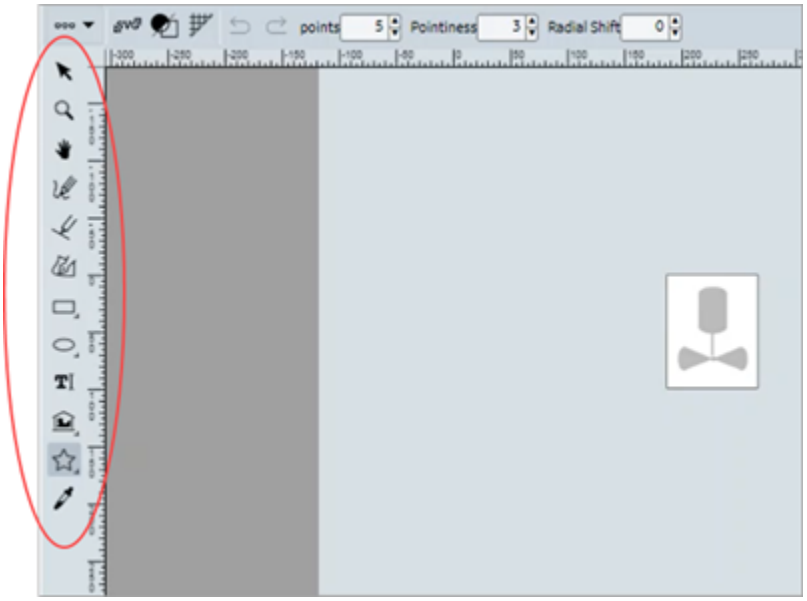
The animation is deleted.

SVG Editor Tools

This topic describes SVG editor tools.

You can modify SVG files using the SVG editor's user-friendly interface.

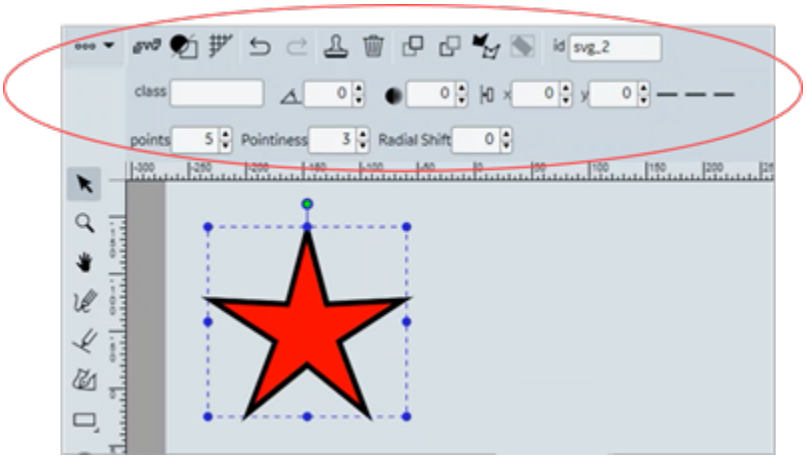
Side Toolbar Options



Tool	Description
Select Tool	Allows you to select and move objects within the editing area.
Zoom Tool	Zoom in/out to view objects at different levels of detail. It helps to perform precise edits and adjustments.
Panning	Helps to pan around when used along with the zoom tool.
Pencil Tool	Use this tool to create any shape or design. You can draw and create custom shapes by dragging the mouse.
Line Tool	To create a perfectly vertical or horizontal straight line, hold down the Shift key while drawing the line.
Path Tool	Use the tool to draw a path creating additional points along the way. A path has a start point, end point, and curve parameters of the path. To create the shape you want, mouse-click and drag. To end the path, double-click.
Square/Rectangle Tool	Create squares or rectangles of different sizes. Useful for creating basic geometric shapes. Hold down the Shift key while drawing to create a perfect shape.
Ellipse/Circle Tool	Create ellipses or circles of different sizes.

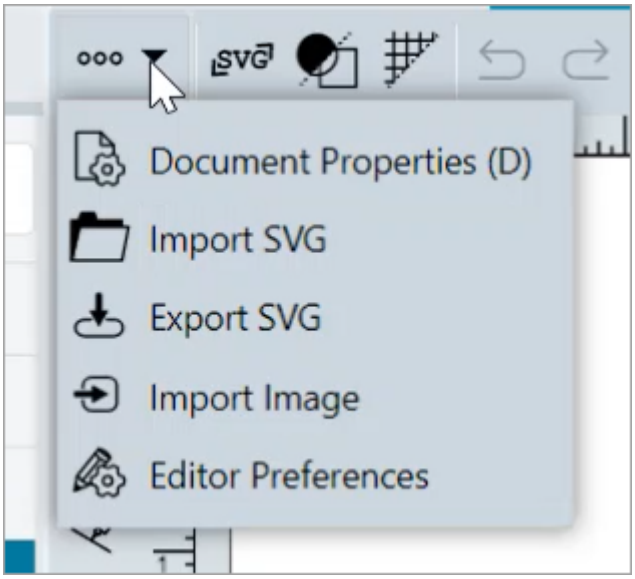
Tool	Description
Text Tool	Allows you to add and edit text within the editing area. Useful for adding labels, annotations, etc.
Shape library	Contains ready-to-use shapes such as geometric shapes, mathematical shapes, flowchart shapes, etc.
Polygon/Star Tool	The polygon tool allows you to create polygon shapes. The star tool allows you to create star shapes. You can resize these shapes without losing their sharpness and quality.
Eye Dropper Tool	Use the tool to pick a color from an existing object. You can now use the picked color for other elements as well.

Top Toolbar Options



The options in the top toolbar may vary based on the selected objects.

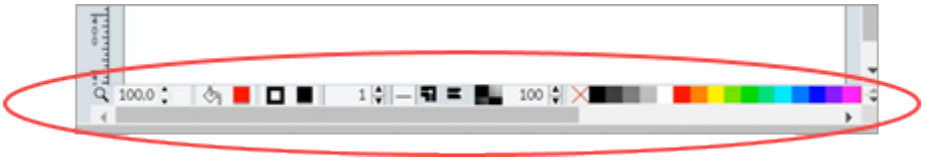
Tool	Description
Document Properties	In the document properties dialog, you can modify the SVG document settings.

Tool	Description
	
Import SVG	Allows to select and import an SVG file containing shapes, text, and/or images to Operations Hub and add interactive animation using our SVG editor. This option allows you to use SVG files created using third party tools, such as Microsoft Powerpoint, Adobe Illustrator, Inkscape, Figma, etc. These are fixed SVG images and do not contain any animation. Such SVGs when imported may get slightly altered to match our SVG format. For example, `tspan` elements are converted to `<text>` elements. You can also modify third party SVGs by editing its source code.
Export SVG	Allows to export the SVG file and save as HMI graphic.
Import Image	Allows to import an image file. For example, PNG, JPEG, etc.
Editor Preferences	In the editor preferences dialog, you can modify the SVG background, units of measurement, and grid settings.
Edit Source	Opens a code editor, wherein you can make changes to the source code and save it.
Wireframe Mode	When you switch to the wireframe mode, visual distractions such as color, texture, and other design elements are removed. This helps to focus on the layout, positioning, and hierarchy of elements, and make adjustments as necessary. Once the basic structure is in place, you can switch

Tool	Description
	back to the normal mode, and continue working on other design elements.
Show/Hide Grid	Shows/hides the grid layout.
Undo and Redo	These buttons allow you to undo or redo changes you've made to the canvas.
Duplicate Element	Duplicates the selected element.
Delete Element	Deletes the selected element.
Bring to Front	When objects overlap on the page, brings the selected object to the front.
Send to Back	When objects overlap on the page, sends the selected object to the back.
Convert to Path	You can convert an object to a path. This option is used along with the path editing tools to turn a simple shape/text into a complex vector shape. Consider these points when using the tool: • Once you convert an object to a path, you cannot easily convert it back to its original form. • Converting an object to a path can make the file size larger.
Reorient Path	Allows you to change the orientation or direction of a path for the selected object, either clockwise or counterclockwise. It is useful when you want to change the starting point or direction of a path without having to redraw it.
Identify the element	When using multiple objects in SVG, this option identifies the selected object within the editing area.
Element class	You can use defined classes to apply styles or behaviors to various elements in SVG file.
Change rotation angle	Rotates the selected object to the selected degrees.
Change gaussian blur value	Increases the blur effect on the object based on the increasing value.
Align	Use the alignment options to position objects within the editing area. Select one or more objects you want to align, and then choose the appropriate alignment option.

Tool	Description
Change X/Y coordinate	Enter the X and Y coordinates of an object to move it to a new position within the editing area. • X coordinate represents the horizontal position of the object. • Y coordinate represents the vertical position of the object.
Link Control Points	Applies to curved paths. You can link the control points to create complex curves and adjust the shape of a path.
Change node's X/Y coordinate	Applies to nodes in a path. Nodes are the points that define the shape of a path. This option allows you to select a node and set its X and Y coordinates within the path.
Clone Node	Clones the selected node.
Delete Node	Deletes the selected node.
Text formatting tools	Select the text element to access tools to perform the following functions: • Choose from a variety of fonts available in the editor. • Adjust the size of your text to make it larger or smaller. • Change the style of your text to bold, italic, underlined, etc. • Align your text. • Adjust the spacing between letters and lines.

Bottom Toolbar Options



Tool	Description
Change zoom Level	Allows you to zoom in and out of the editing area for more precise editing. Use the preset options to apply the zoom level.
Change fill Color	To change the fill color, select the shape/object and from the color palette, choose a color to fill the shape/object.

Tool	Description
Change stroke Color	To change the stroke color, select the shape/object and from the color palette, choose a color to apply to the shape/object.
Change stroke width by 1, shift-click to change by 0.1	Allows to change the width of the stroke.
Change stroke dash style	Select the line/shape to change its stroke dash style and apply a new style (dots, dashes, etc.) from the available preset options.
Linejoin	You can set any of these linejoin options to set the corners of a shape/line: • Miter: At the meeting point of two lines, applies a pointed corner. • Round: At the meeting point of two lines, applies a rounded corner. • Bevel: At the meeting point of two lines, applies a flat and beveled corner.
Linecap	You can set any of these linecap options to set the ends of a line: • Butt: Applies a flat end to the line that is perpendicular to the direction of the line. • Square: Applies a flat end to the line that is slightly wider than the line itself. • Round: Applies a rounded end to the line.
Change selected item opacity	Select the item (shape, line, group of objects, or any other element in your SVG file) for which you want to modify the opacity. Set the opacity percentage for the item.
Click to change fill color, shift-click to change stroke color	Allows to change the color.

Chapter 8. Webspace

Introduction to Webspace

Proficy Webspace is an easy-to-use, full-featured Web and mobile client that enables you to extend, expand, and enhance your new or existing iFIX or CIMPLICITY applications systems. It allows you to open pictures in run mode from a web session, enabling full control and visualization over your company Intranet or secure Internet without the need to change or alter your software application.

Webspace is a server-based, thin-client solution that eliminates the need for Citrix MetaFrame or Windows Terminal Services and can be set up within minutes.

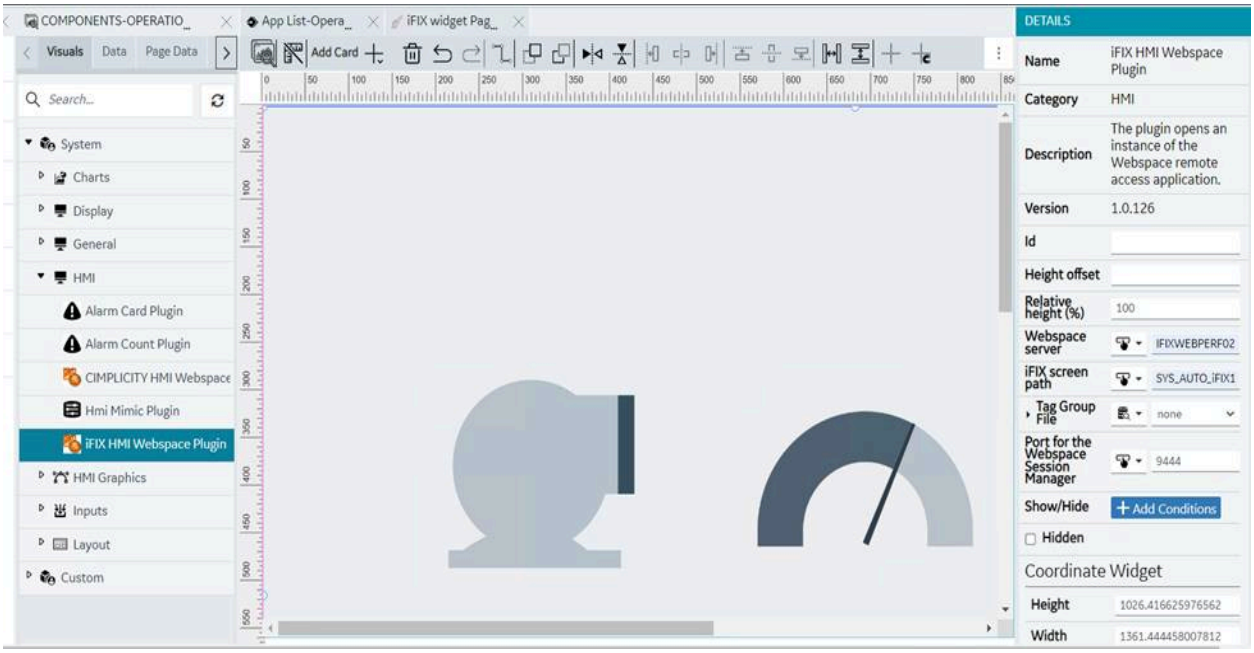
Overview of Webspace with Configuration Hub

This topic provides an overview of Webspace within Configuration Hub. For more details on the Webspace Admin app configuration that can be done on the Webspace Server, refer to the Webspace documentation.

Overview

Use the Webspace widget along with other Operations Hub widgets for better consolidation and visualization of data.

The iFIX HMI Webspace Plugin is available in Configuration Hub from the **Operations Hub** > **Applications** > **HMI** page. To add an iFIX HMI Webspace Plugin widget, drag-and-drop the widget to a container application and configure its properties.



Limitations

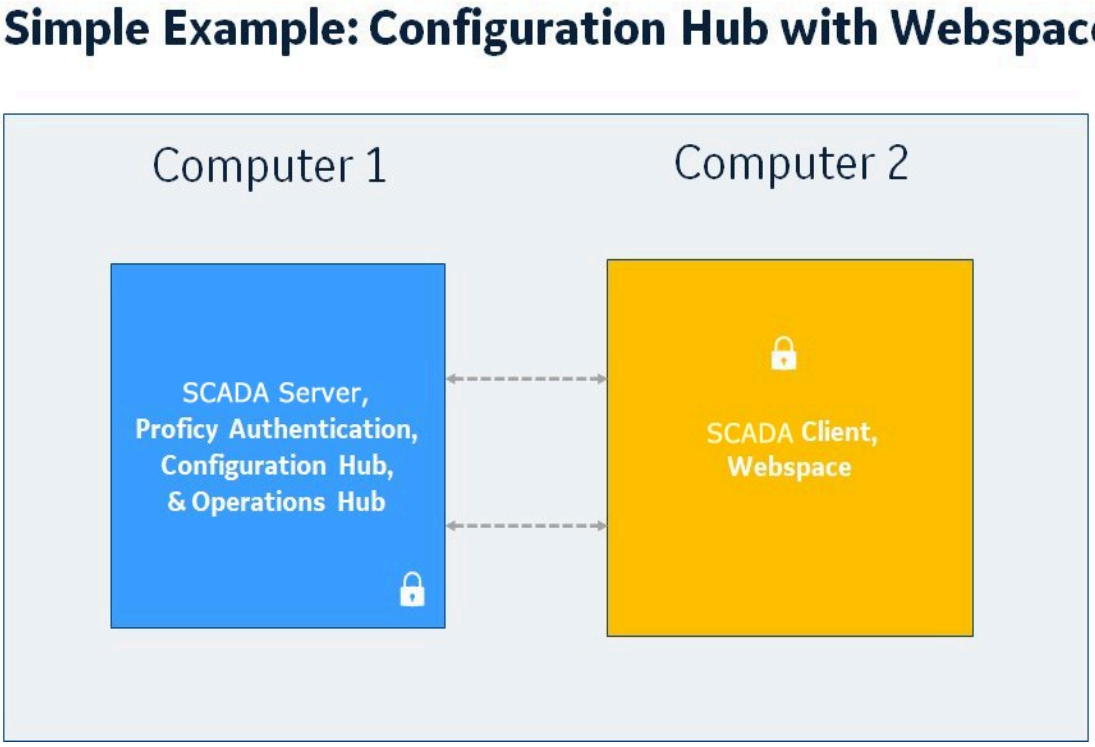
Be aware of the following limitations when using the iFIX HMI Webspace Plugin with Operations Hub and Configuration Hub:

- The Webspace Server should not be installed on a Failover pair, or on the Operations Hub server or Configuration Hub server.
- Webspace sessions require credentials for logging into the windows server Webspace is running on.
- When Webspace sessions are started, the iFIX Default Project Node Name get updated with the last run iFIX Project Node Name/SCU file. Since you cannot update or start an iFIX with a specific Node Name from Configuration Hub, you should manually start iFIX in this instance. To start iFIX with correct Node Name manually, use the iFIX Startup screen (and not Configuration Hub).

Sample Webspace Deployment Architecture

The following figure shows a sample deployment architecture for Configuration Hub with Webspace. It is recommended that the Webspace server is not located on the same machine as the Configuration Hub or Operations Hub server.

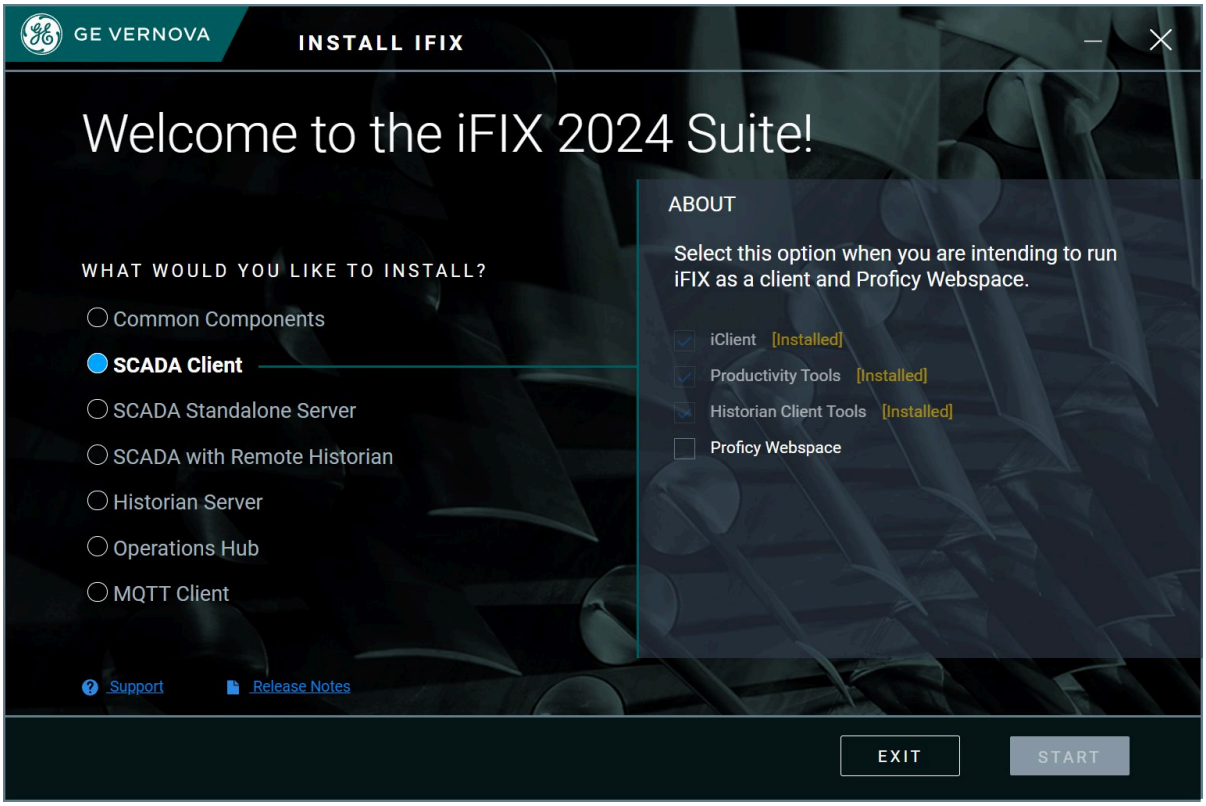
The following figure shows an example of a simple two node scenario with Webspace and Configuration Hub.



How to Install a Webspace Server

Use the SCADA Client install option on the Proficy Installer to install Webspace, as shown in the following figure.

Note:
After you install Webspace, you will then need to register with Configuration Hub using the registration tool. For steps, see Registration with Configuration Hub for Webspace *(on page 1580)*.

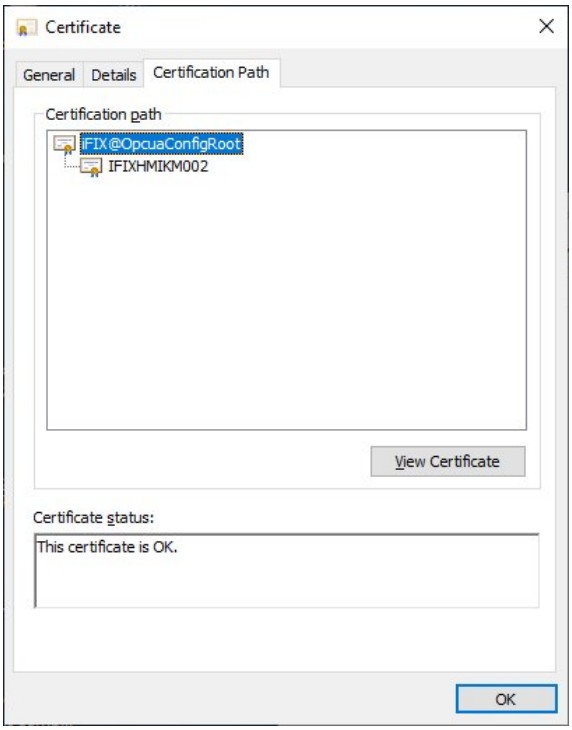


1. From the SCADA Client, select **Proficy Webspace** to install the Webspace Server.
2. Click **Start**. The License Screen appears.
3. Select **Accept** to continue the install and accept the terms and conditions. Next the Install Location screen appears.
4. Leave the default path and port and click **Next**. The Start Install screen appears.
5. Click **Install**. After the Install completes, a message appears.
6. Click **Close** to exit the installer.
7. Export the Webspace certificate and then import it on to the Configuration Hub server. For steps, refer to these topics: Exporting the Root Certificate for Webspace Setup *(on page 1577)* and Importing the Certificate for Webspace Setup *(on page 1579)*.
8. Register Webspace with your existing Configuration Hub. For steps, refer to this topic: Registration with Configuration Hub for Webspace *(on page 1580)*.

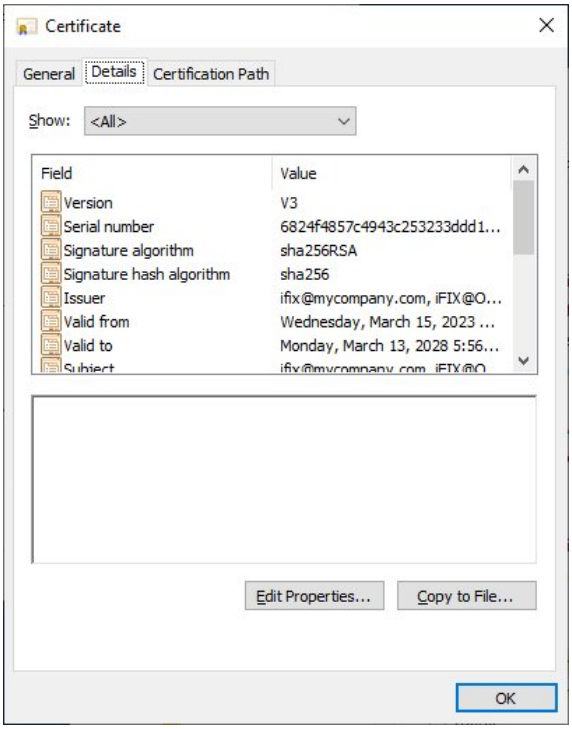
Exporting the Root Certificate for Webspace Setup

Use the following steps to export a root certificate from the Webspace server, so that you can install the certificate on the Configuration Hub Server machine.

1. :On the Webspace server, navigate to the `C:\Program Files (x86)\Proficy\iFIX\web\conf` folder.
2. Double-click the iFIX_OpcuaConfigServer.crt file.
   The Certificate Details dialog box appears.
3. Select the **Certificate Path** tab.

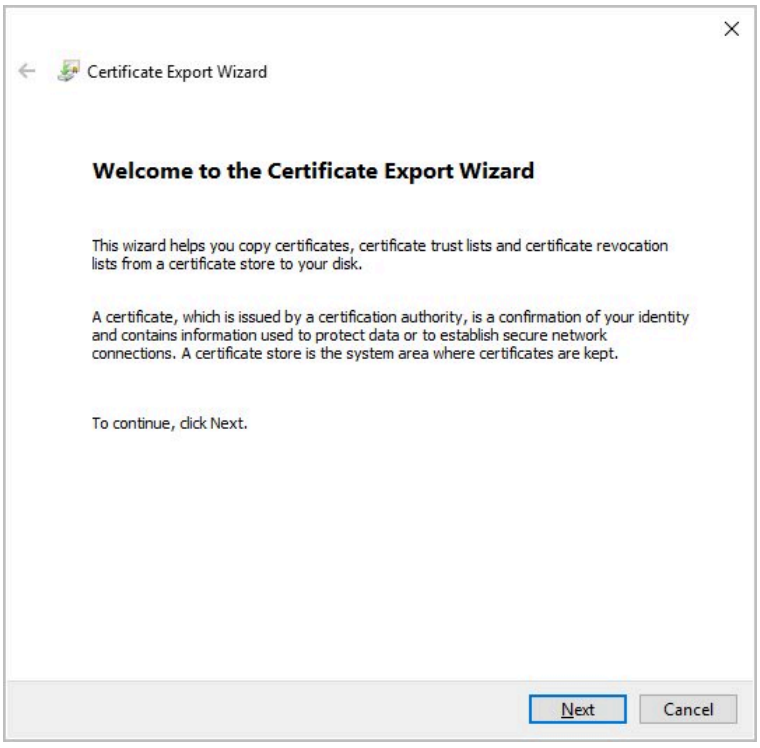


4. In the Certificate Path box, select iFIX@OpcuaConfigRoot (if it is not already selected) and then click the **View Certificate** button.
   The Certificate Information dialog box appears.
5. Select the **Details** tab, as shown in the following figure.



6. Click **Copy to File**.

   The Certificate Export wizard appears, as shown in the following figure.



7. Click **Next**.

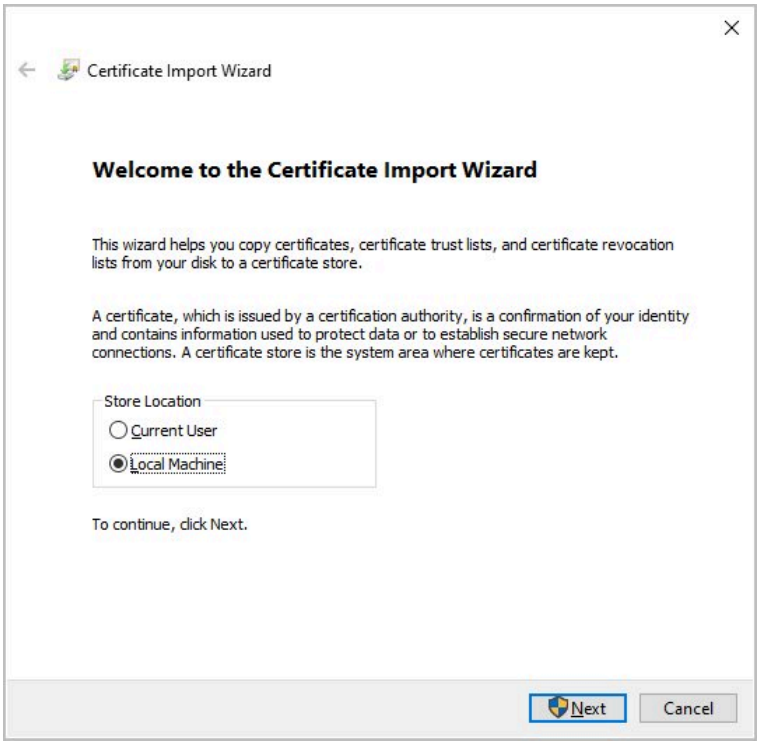
   The first screen of the wizard appears.

8. Leave the default of **No, do not export the private key**, and then click **Next**.
9. On the Export File format, select **DER encoded binary X.509 (.CER)**, and click **Next**.
10. On the File to Export screen, browse to the location where you want to save the file, and enter a name.
11. Click **Finish**.
    The Certificate is generated in the specified folder.
12. Next, copy the root certificate from the output folder to the Configuration Hub machine so that you can install it. *(on page 1579)*

Importing the Certificate for Webspace Setup

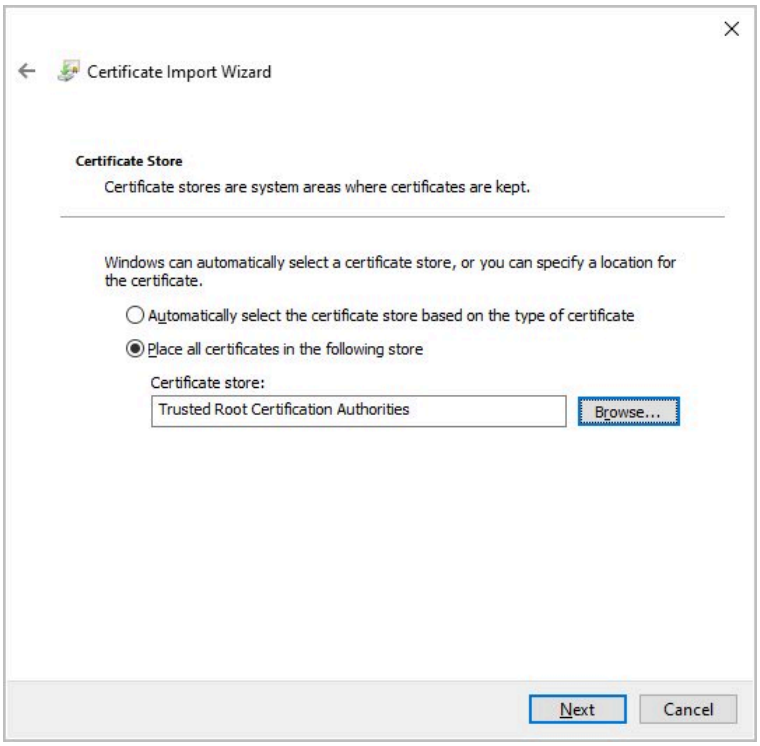
Use the following steps to install a root certificate from the Webspace server, so that you can install the certificate on the Configuration Hub Server machine.

1. Take the certificate that you exported from the Webspace server *(on page 1577)* and copy it to your Configuration Hub server machine. *(on page 1574)*
2. Double-click the certificate file to install it.
   The Certificate Import Wizard appears.

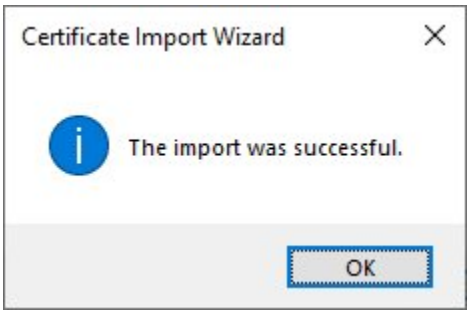


3. Select the **Local Machine** option and click **Next**.
   The Import File screen appears in the wizard with your certificate selected.
4. Confirm that the folder and file name are correct, and click **Next**.

5. On the Private Key Protection screen, enter the password and click **Next**.
6. On the Certificate Store screen, select the **Place All Certificates in the following store** option, and click **Browse**.
7. Select the **Trusted Root Certification Authorities** option, and click **OK**.



8. Click **Next**, and then click **Finish** to import the certificates.

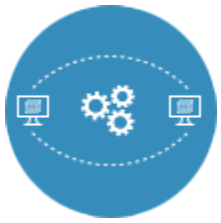


A message appears that "The import was successful" when the certificate installs correctly.

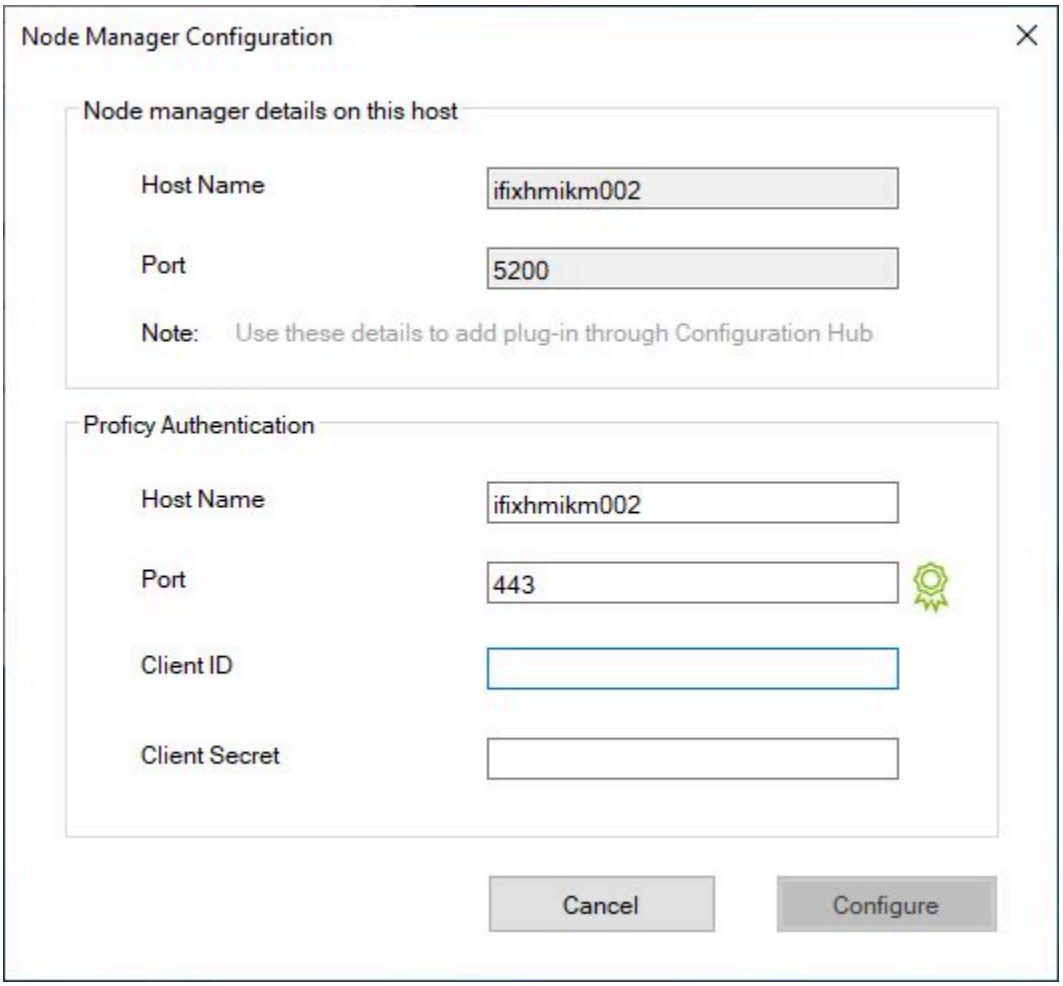
Registration with Configuration Hub for Webspace

After you install Webspace, you must launch the iFIX registration page to register it with the existing Configuration Hub server. Use these steps to register iFIX with Configuration Hub after Webspace is installed.

1. On the machine where Webspace/iFIX is installed, click the Node Manager Configuration utility, as shown in the following figure.



The following screen appears.



2. Enter the **Client ID** and **Client Secret** you used for installing Proficy Authentication.
3. Click **Configure** to register the node with Proficy Authentication.

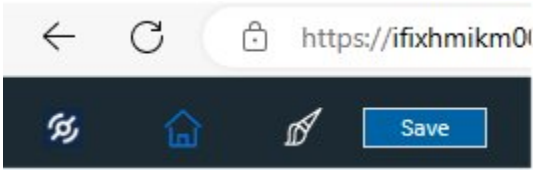
4. After registration is complete, refresh your web browser or logout and log back into the Configuration Hub.

   Result: After completing these steps for Configuration Hub, the Webspace panel should now work with the iFIX plugin.

Webspace Settings in Configuration Hub

Use these steps to setup Webspace in Configuration Hub after you installed the certificate from the Webspace Server and registered your Configuration Hub and Proficy Authentication Servers.

1. Click the Configuration Hub icon on the desktop to login to Configuration Hub.
2. Enter a valid user name and password (that you entered when you installed Configuration Hub), and click **Sign-in.**
3. Navigate to Webspace panel. In the navigation tree, locate the Webspace Server machine
4. Enter the valid Windows credentials for the user name and password.
5. Select the **Enable Webspace Strong Encryption** option.
6. Click **Test** to confirm that you can connect to the Webspace Server.
7. In the Session Pool area, leave the default **Cache Size**.
8. Click **Save**.

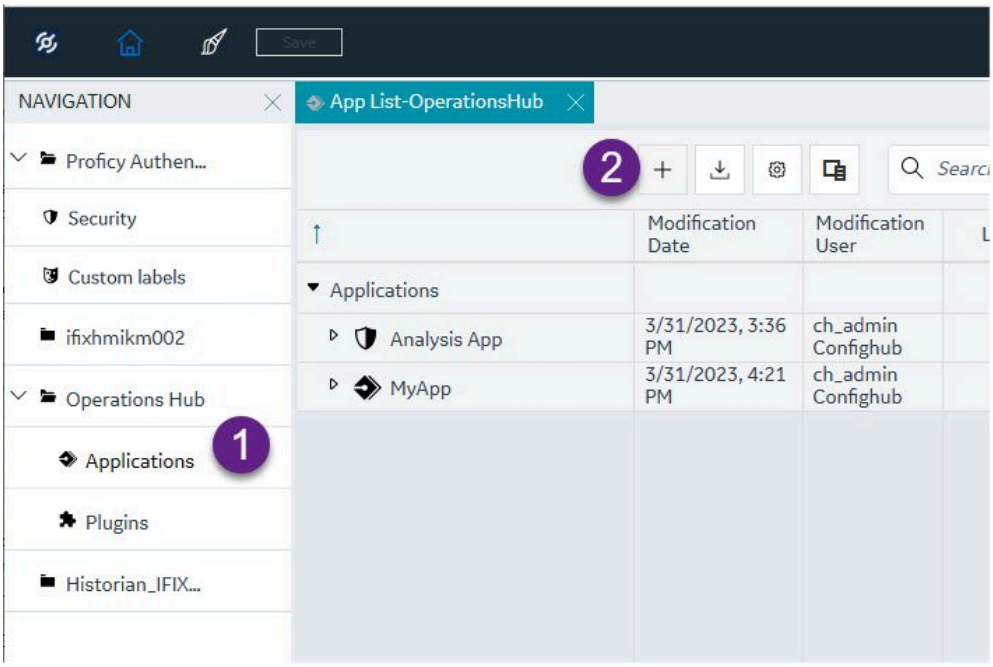


Webspace Plugin in Operations Hub

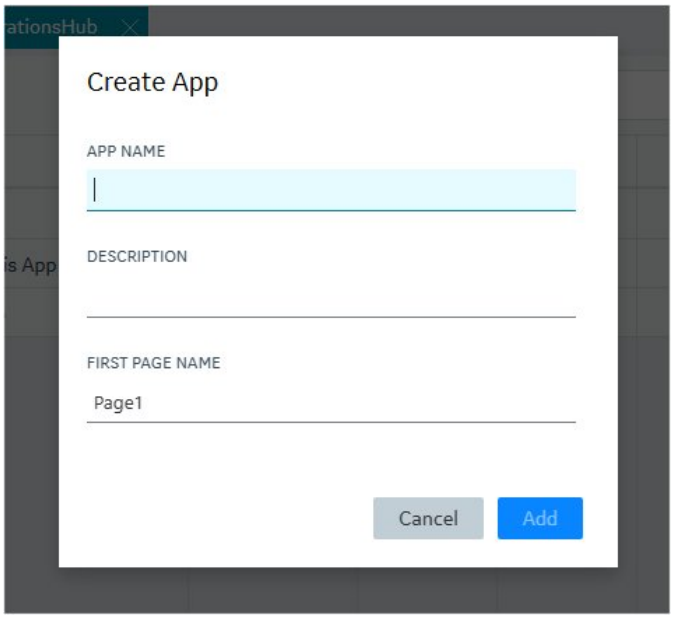
Use the following steps from Configuration Hub to add Webspace to an Operations Hub application. Webspace can be used with either iFIX or CIMPLICITY.

Create a New Application with the Webspace plugin

1. In Configuration Hub, from the Navigation pane, browse to Operations Hub and then Applications.
2. Next, click the + icon to add application, as shown in step 2 below.



The Create App dialog box appears, as shown in the following figure.



3. In the App Name field, enter a name.
4. Optionally, provide a description.
5. Click **Add**.
6. From Operations Hub, navigate to the **HMI** folder.

7. Drag-and-drop the **iFIX HMI Webspace Plugin** or **CIMPLICITY HMI Webspace Plugin** to the workspace. Resize the plug-in as needed.
8. On the Details pane, provide the **Webspace Server Name** path and the **Port for the Webspace Session Manager**.

   Note:
   The other Webspace properties are listed in the tables that follow.

9. Click on **Save** button.
10. Launch the App.

iFIX: Webspace Plugin Properties

The following table lists the different Webspace widget properties for iFIX.

Property	Description
ID	The ID name you choose to give your Webspace plugin instance in your application.
Height offset	Webspace frame will take the proportion specified in Relative height of the browser window minus this offset. It is useful when there are other widgets on the page above or below the Webspace frame.
Relative height (%)	Webspace frame will take this proportion of the height of the browser window minus the Height offset. It is useful when there are multiple Webspace widgets placed vertically on the page.
Webspace server	Specify the machine that has iFIX Webspace running on it.
iFIX screen path	Specify the path to the screen to load. This path is where the file resides on the Webspace system.
Tag Group File	Specifies the tag of the tag group to open with the picture.
Port for the Webspace Session Manager	The port configured on the Webspace system for the Webspace Session Manager service. `9444` is the default port setting.
Show/Hide	Click the Add Conditions button to add conditions to run when the iFIX Webspace widget runs.
Hidden	Select the check box if you want to hide the iFIX Webspace plugin on screen.

CIMPLICITY: Webspace Plugin Properties

The following table lists the different Webspace widget properties. For more information on CIMPLICITY and Webspace, refer to the Webspace section in the CIMPLICITY online help.

Property	Description	Can it be dynamically updated?
Screen Variables	A list of name/value pairs that correspond to the variables used on a CIMPLICITY screen. For non-manual configuration, this list is expected to be a JSON string:[{ "name":"..", "value": ".."}, ...]	Yes
Webspace server	Specify the machine that has CIMPLICITY Webspace running on it.	Yes
CIMPLICITY screen path	Specify the path to the CimView screen to load. This path is where the file resides on the Webspace system:`C:\ProjectsFolder\screens\ScreenName.cim`	Yes
Project for unqualified points	CimView will use this project name to provide values for unqualified points.	Yes
Zoom to best fit	If the CimView screen sizes are different, zoom to best fit provides automatic consistency in the Webspace frame.	Yes
Disable point targets	Prevents point targets, for example, Point Control Panel and quick trends, from being available.	Yes
Disable setpoints	Prevents point values from being set on the CIMPLICITY screen.	Yes
Port for the Webspace Session Manager	The port configured on the Webspace system for the Webspace	Yes

Property	Description	Can it be dynamically updated?
	Session Manager service. `9443` is the default port setting.	
Start maximized	Select the check box if you want to open CimView screen in a maximized window filling the whole Webspace frame.	No
Always maximized	Select the check box if you want the screen to always be maximized in the Webspace frame.	No
Restrict screen opening	Select the check box if you want to open only the CimView screens that are explicitly mentioned in the Open Screen and Overlay Screen actions.	No
Disable window resizing	Select the check box if you do not want to allow resizing the CimView screens within the Webspace frame.	No
Don't show caption and menu	Select the check box if you want to hide the CimView menu bar and caption in the Webspace frame.	No
Time without input till quiescent update rate	Webspace will continue to send updates to the client at the normal rate for the number of seconds entered after the user stops using the keyboard and/or mouse.	No
Time between updates when quiescent	When the number of seconds to wait after the user stops using the keyboard and/or mouse have been reached, Webspace will be-	No

Property	Description	Can it be dynamically updated?
	gin sending the updates at this rate.	

Troubleshooting Webspace with Configuration Hub

This topic describes how to troubleshoot connection issues with the Webspace widget in Configuration Hub, with Operations Hub installed.

What to do if Operations Hub Does Not Display in Configuration Hub in the Navigation Pane

If you cannot see the Operations Hub widget in the Configuration Hub navigation pane, try re-registering Operations Hub. For more details, see: Central Registration *(on page 91)*.

Contents

Chapter 13. Important Product Information....17

What's New in Configuration Hub 2024.... 17

Known Issues and Limitations 20

Fixed Defects 23

System Requirements 24

Chapter 14. Getting Started.... 26

Introduction to the Configuration Hub Framework....26

Sample Deployment Architectures....27

Install and Uninstall Options.... 31

Available Product Plugins....38

Common Panels.... 40

Common Panels....40

Application Bar 40

Navigation Panel....42

Details Panel....44

Concurrency Management....47

Node Management....48

Node Manager - Administration.... 48

Certificate Management....66

Overview....66

Product Registration....86

Overview....86

Install Time Registration.... 87

Central Registration.... 91

Upgrade/Migration Considerations.... 100

Central License Management....101

Central License Management....101

High Availability for Configuration Hub 110
Overview 110
Configure High Availability 112
Install Failover Clustering Feature 114
Create Failover Cluster 115
Create Role 119
Create Client Access Point (Virtual IP) 122
Add Dependencies to Role 124
Create Network Attached Storage 125
Install Configuration Hub on Cluster Nodes 128
Handling Silent Installation 132
Chapter 15. Proficy Authentication 135
About Proficy Authentication 135
Set up Proficy Authentication 135
Get Started With Proficy Authentication 141
Manage Identity Providers 146
LDAP 146
SAML 155
Enable Multi-Factor Authentication 179
Delete Identity Provider 182
Manage Groups 183
Overview of Managing Groups in Proficy Authentication 183
Create Groups 189
Modify Groups 191
Map Groups 192
Add/Remove Users in a Group 195
Add/Remove Sub-Groups in a Group 196
Delete Group 197
Manage Users 198

Create Users....198
Add/Remove Groups for a User....200
Reset User Password....202
Delete User....203
Windows Integrated Authentication / Auto-login....204
Configure Security Policy....207
Create Service Principal Name....209
Generate Keytab File....212
Proficy Authentication Service Configuration....215
Configure Browser....216
Example Configuration for Multi-domain and Auto-login Functionality....217
High Availability....220
Configure High Availability for Proficy Authentication....220
Configure iSCSI Target....222
Configure iSCSI Initiator....222
Create a Virtual Disk....225
Initialize a Virtual Disk....226
Create a Cluster....228
Configure Role....233
Configure Proficy Authentication Installation....238
Prerequisites for Installing Operations Hub with External Proficy Authentication....243
Customize Login Screen....248
Backup and Restore....250
Back Up the Proficy Authentication Database....250
Restore the Proficy Authentication Database....252
Troubleshooting Proficy Authentication....252
Error 431: Request Header Fields Too Large....252
Windows Auto-login Error Logs....253
Issue: Duplicate LDAP User Creation in Proficy Authentication Database....260

Chapter 16. iFIX..... 262

Overview 262

iFIX Overview..... 262

Overview of iFIX in Configuration Hub..... 262

Integrated Development Environment..... 264

Prerequisites to Use Configuration Hub with iFIX..... 264

Configuration Information..... 265

Access iFIX Web Configuration..... 276

Connections 278

Connections Overview..... 278

OPC UA Connections 278

IGS Connections..... 290

Drivers..... 298

Network Connections..... 300

Special Considerations for SCADA Enhanced Failover..... 305

SQL Connections..... 307

Model 310

Model Overview..... 310

Model Panel..... 311

Type Creation..... 313

Type Variables 315

Template Overview..... 318

Template Management..... 318

Substitutions..... 321

Expression Builder..... 323

Object Creation..... 323

Model Import and Export..... 324

Model Tags in iFIX..... 325

Database..... 328

Database Overview....328
Database Management....334
Tag Management....386
Validations....388
Custom Editors....389
Tag Properties....390
Project Security....930
Overview of Project Security....930
Add or Modify Users....931
Add or Modify Groups for Proficy Authentication....934
Add or Modify Security Areas....935
Auto Login Configuration....937
Alarms....939
Defining Alarm Areas....939
Alarm Services....941
Alarm Printers....946
Alarm Events....948
Alarm Queue Configuration....950
Common Message Format Configuration....952
Common Alarm Areas Configuration....953
Alarm Clients....954
Project Settings....955
Overview of Project Settings....955
Starting and Stopping iFIX Projects....958
Add a New Project....960
Add an Existing Project....962
General Settings....963
Startup Options....965
Startup Schedules....968

Startup Pictures..... 969
Historian.....970
SCADA Failover..... 971
Task Configuration.....975
Deployment..... 979
Project Deployment..... 979
Save and Publish.....981
Chapter 17. CIMPLICITY.....984
Overview..... 984
Overview of CIMPLICITY in Configuration Hub..... 984
Access Configuration Hub from CIMPLICITY.....985
Registration..... 987
About Registering the CIMPLICITY Plug-in.....987
CIMPLICITY Plug-in Registration Use Cases..... 988
Register the CIMPLICITY Node with Proficy Authentication..... 991
Add the CIMPLICITY Node and Register the Plug-in with Configuration Hub..... 993
Managing CIMPLICITY Plug-in in Configuration Hub..... 998
Start and Stop a CIMPLICITY Project..... 998
Select and Browse Devices..... 1001
Select and Browse Tags from an MQTT Device..... 1005
Create SCADA Points..... 1008
Update or Modify CIMPLICITY Node or Plug-in 1011
Unregister CIMPLICITY Plug-in 1014
Delete CIMPLICITY Node..... 1017
Chapter 18. Historian..... 1021
Overview.....1021
Historian Overview.....1021
Overview of Historian in Configuration Hub.....1021
Workflow.....1023

Setting up Configuration Hub....1023
About Setting up Configuration Hub....1023
Install the Historian Server....1024
Install Web-based Clients....1033
Install Collectors....1050
Perform Post-Installation Tasks....1054
Upgrade....1055
Access Configuration Hub....1055
Historian Plugin Management in Configuration Hub....1060
Common Tasks....1072
Setting up a Stand-Alone System....1075
About Setting up....1075
Add a Collector....1076
Add Tags....1077
Setting up a Horizontally Scalable System....1079
About Setting up a Horizontally Scalable System....1079
Add a Server....1080
Add a Collector....1081
Add Tags....1082
Browse Tags using Distributed or Mirror Node Servers when Primary Server is Inactive....1084
Setting up High Availability....1086
About Data Mirroring....1086
Create....1087
Create a Data Store....1089
Creating a Model....1090
About a Historian Model....1090
About Object Templates....1095
Workflow for Creating a Historian Model....1098
Create an Object Type....1099

Include a Contained Type.... 1104
Create an Object Instance.... 1107
Provide Data for a Static Variable.... 1109
Collect Data for a Direct Variable.... 1111
Collect Data for an Indirect Variable.... 1114
Export an Object Type/Instance.... 1119
Import an Object Type/Instance.... 1121
Copy an Object Type.... 1122
Delete a Template.... 1126
Delete an Object Instance.... 1128
Delete an Object Type.... 1129
Managing Historian Systems.... 1130
Access a System.... 1130
Access the Collectors in a System.... 1139
Access Offline Configuration Collectors.... 1141
Access the Tags in a System.... 1144
Add a System.... 1146
Add a Server.... 1147
Set Up a Mirror of Mirror.... 1148
Remove a Server.... 1158
Set a Default Location.... 1158
Modify a System.... 1159
Configure Advanced Settings.... 1160
Configure Labels of Spare Fields.... 1163
Set a Default System.... 1164
Delete a System.... 1164
Managing Mirror Locations.... 1165
Create.... 1165
Rename.... 1166

Add a Machine....1167
Remove a Machine....1168
Delete....1169
Managing Data Stores....1170
About Data Stores....1170
Create a Data Store....1171
Access a Data Store....1172
Rename a Data Store....1177
Set as Default....1181
Access Archives....1182
Apply Configuration Template....1182
Multiple Archive Paths....1183
Access Activity Logs....1189
Access Tags....1189
Specify Tags for Data Collection....1190
Add a Tag Manually....1192
View Performance....1195
Delete....1197
Adding a Collector Instance....1198
The Calculation Collector....1198
CygNet Collector....1201
The File Collector....1205
The HAB Collector....1208
About Adding an iFIX Collector Instance....1220
The iFIX Collector....1224
The MQTT Collector....1229
The MQTT Sparkplug B Collector....1238
The ODBC Collector....1246
The OPC Classic Alarms and Events Collector....1251

The OPC Classic DA Collector....1253
The OPC Classic HDA Collector....1259
The OPC UA DA Collector....1263
The OSI PI Collector....1268
The OSI PI Distributor....1272
The Python Collector....1275
The Server-to-Server Collector....1278
The Server-to-Server Distributor....1282
The Simulation Collector....1286
The Windows Performance Collector....1290
The Wonderware Collector....1294
Collector Configuration - Common Fields....1298
Sending Data to Cloud....1306
Alibaba Cloud....1306
AWS Cloud....1313
Azure Cloud (Key-Value Format)....1320
Azure Cloud (KairosDB Format)....1327
Google Cloud....1333
Predix Cloud....1340
Protocols and Port Numbers....1345
Managing Collector Instances....1346
Managing Collectors Using Configuration Hub....1346
Access a Collector....1347
Access Tags....1350
Add a Collector....1351
Enable MTLS Security for Collectors....1351
Modify a Collector....1353
Add a Comment....1354
Access Comments....1355

Start a Collector....1356
Stop a Collector....1357
Restart a Collector....1358
Pause Data Collection....1360
Resume Data Collection....1361
Clear Buffer....1362
Move Buffer....1363
Change Destination....1364
Reset Performance Counters....1365
Reset Overruns....1366
Update Collector Credentials....1367
Apply Configuration Template to a Collector....1369
Configure Collector Redundancy....1370
Delete a Collector....1373
Managing Offline Configuration Collector Instances....1374
Access Offline Configuration Collectors....1374
Manage Offline Configuration Collectors....1376
Access Tags....1377
Managing Tags....1378
About Tags....1378
About Array Tags....1379
About Collector and Archive Compression....1379
About Scaling....1385
About Condition-Based Collection....1385
Specify Tags for Data Collection....1386
Add a Tag Manually....1388
Access a Tag....1391
Configure Multiple Tags....1406
Access Trend Chart....1408

Access Last 10 Values....1409
Access a Tag Alias....1413
Export Tags as a CSV File....1414
Import Tags from a CSV File....1416
Rename a Tag....1417
Copy a Tag....1419
Stop Data Collection....1421
Resume Data Collection....1422
Remove a Tag....1423
Delete a Tag....1424
Managing Enumerated Sets....1426
About Enumerated Sets....1426
Create an Enumerated Set....1427
Assign an Enumerated Set to a Tag....1429
Export an Enumerated Set....1429
Import an Enumerated Set....1430
Rename Enumerated Set....1430
Delete Enumerated Set....1431
Managing Data Attribute Enumerated Set....1431
About Data Attribute Enumerated Set....1431
Create a Data Attribute Enumerated Set....1432
Assign a Data Attribute Enumerated Set to a Tag....1435
Export Data Attribute Enumerated Sets....1436
Import Data Attribute Enumerated Sets....1436
Rename a Data Attribute Enumerated Set....1437
Delete a Data Attribute Enumerated Set....1437
Managing User-Defined Data Types....1438
About UDTs....1438
Create UDT....1438

Assign to Tag....1439
Export User-defined Types....1440
Import User-defined Types....1440
Rename User-defined Types....1441
Delete User-defined Types....1441
Managing Archives....1442
About Archives....1442
Guidelines for Archive Sizing....1443
Access an Archive....1444
Create Archives Automatically....1446
Create Archives Manually....1447
Back up an Archive....1449
Back up Archives with Volume Shadow Copy Service....1450
Restore an Archive....1452
Close an Archive....1453
Remove an Archive....1453
Reading/Writing Data....1453
Query Data....1453
Write Data....1457
About Saved Query....1460
Managing Alarms and Events....1469
About Alarms and Events....1469
Requirements....1469
Create an Alarm....1470
Access/Filter Alarms....1471
Back up Alarms....1472
Restore Alarms....1473
About Purging Alarms....1473
Managing Configuration Templates....1476

About Configuration Templates....1476
Create a Configuration Template for Collectors....1476
Apply Configuration Template to a Collector....1484
Create a Configuration Template for Data Stores....1486
Apply the Configuration Template to a Data Store....1491
Managing Reports....1492
About Reports....1492
Generate Reports....1493
Export the Generated Report as a CSV File....1500
Save the Generated Report as a PDF File....1500
Accessing Activity Logs....1501
Troubleshooting Historian and Configuration Hub....1503
Chapter 19. Operations Hub....1508
Operations Hub Overview....1508
Overview of Operations Hub with Configuration Hub....1508
Installation Process Overview....1509
Operations Hub (New Layout)....1510
Panels Layout....1510
Navigation Panel....1512
Components Panel....1515
Display Panel....1527
Details Panel....1532
HMI Graphics....1546
Chapter 20. Webspace....1573
Introduction to Webspace....1573
Overview of Webspace with Configuration Hub....1573
Sample Webspace Deployment Architecture....1574
How to Install a Webspace Server....1575
Exporting the Root Certificate for Webspace Setup....1577

Importing the Certificate for Webspace Setup....1579
Registration with Configuration Hub for Webspace....1580
Webspace Settings in Configuration Hub....1582
Webspace Plugin in Operations Hub....1582
Troubleshooting Webspace with Configuration Hub....1587
Chapter 22. MQTT Client....1603
Overview....1603
Introduction....1603
Prerequisites and Hardware Requirements....1604
Sample Deployment Architectures for MQTT Client....1604
Registration....1606
Overview of MQTT Client Registration....1606
Central Registration for MQTT Client....1607
Install Time Registration for MQTT Client....1618
Configuration....1628
MQTT Client Configuration....1628
Save and Publish....1657
OPC UA for MQTT Clients....1663
Chapter 23. Settings....1672
Switch Users....1672
Modify Layout....1672
Host Name Changes for Configuration Hub....1672
Port Changes for Configuration Hub....1674
Chapter 24. Troubleshooting....1676
Log Files....1676
Frequently Asked Questions....1679

Chapter 9. MQTT Client

Overview

Introduction

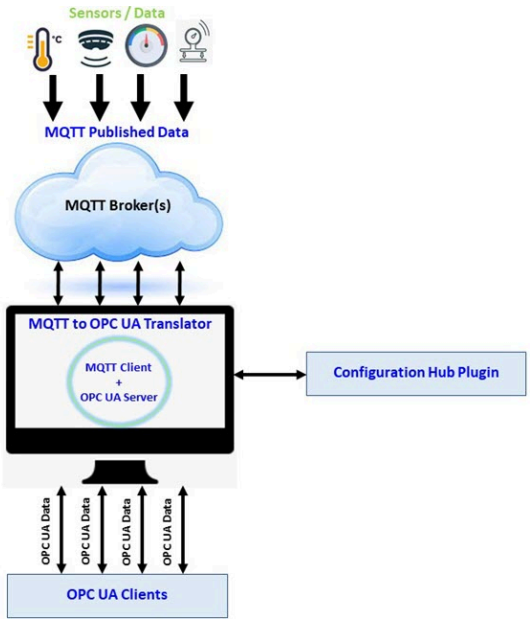
This document describes the importance of the MQTT Client application and its purpose in the Proficy product suite. The MQTT Client application can be installed along with the SCADA products using the iFIX Integrated installer.

Data published from devices such as sensors, units, and other PLCs, is consumed by the MQTT clients. For better communication and interoperability of the SCADA products with MQTT data, we need to support the MQTT protocol. Data received by the MQTT Client is translated to OPC UA data. The translated data is then used by the SCADA products to visualize and monitor the data. This allows you to leverage the advantages of both the MQTT and OPC UA protocols.

The MQTT Client establishes a connection with the MQTT broker and subscribes to the data published on various topics. The published data received through the MQTT Client is then translated into OPC UA data. The OPC UA clients in products such as iFIX, CIMPLICITY, Operations Hub, and so on can connect to the OPC UA server and subscribe to the data.

All the SCADA products at GE can now leverage this application to handle and support MQTT data received from the Client applications.

MQTT in Configuration Hub helps you to configure the MQTT Client and OPC UA Server.



Prerequisites and Hardware Requirements

The following should be installed on your machine before you install the MQTT Client application:

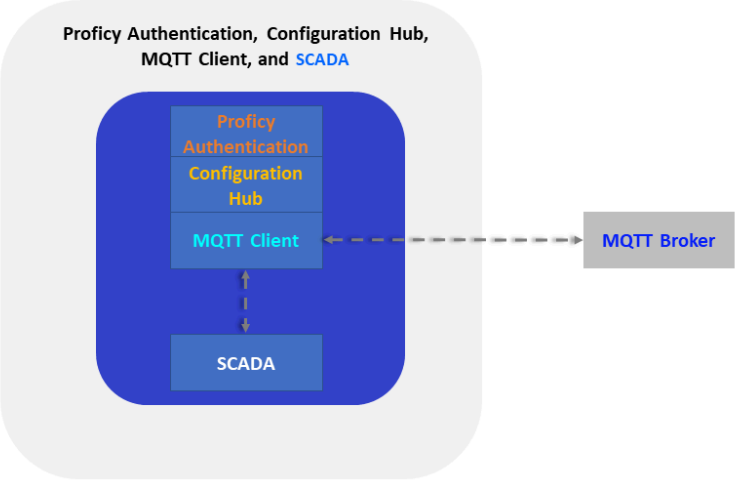
- Proficy Authentication 2024
- Configuration Hub 2024
- iFIX 2024

Sample Deployment Architectures for MQTT Client

The following examples show different types of deployment architectures to use with the MQTT Client. Configuration Hub and Proficy Authentication are installed only once in each architecture.

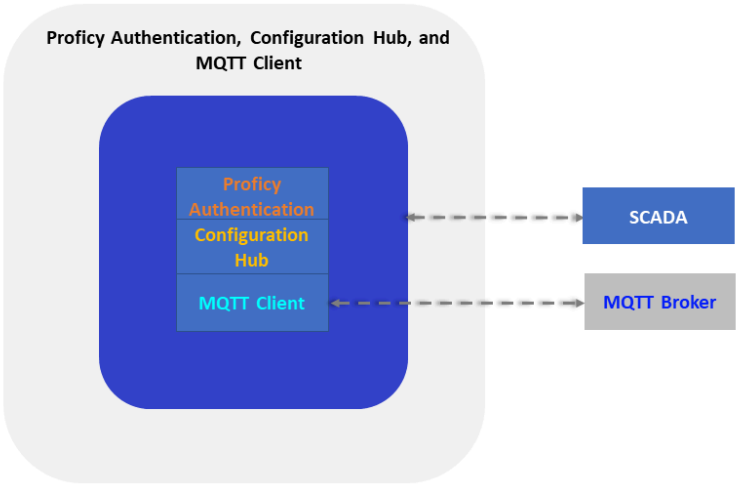
Example 1

The following example shows Configuration Hub, Proficy Authentication, and the MQTT Client installed with SCADA in one computer.



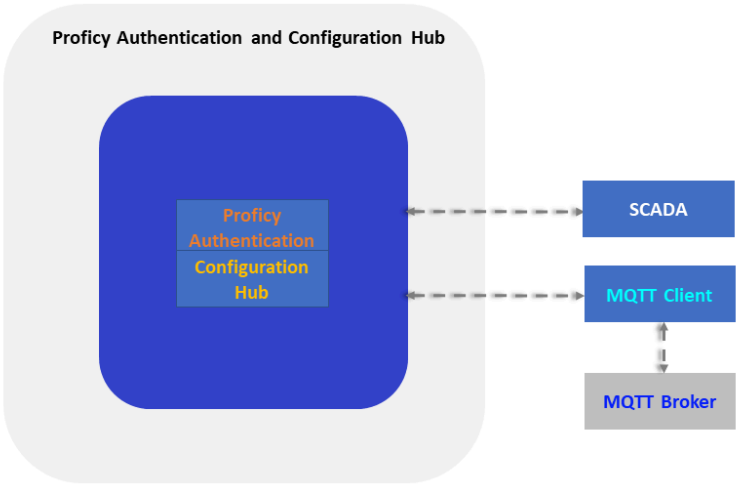
Example 2

The following example shows Configuration Hub, Proficy Authentication, and the MQTT Client installed in one computer, and SCADA on different computer.



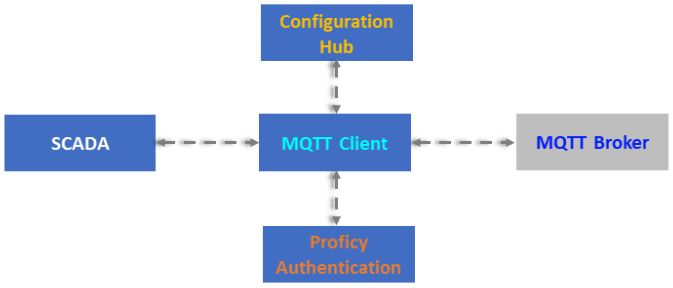
Example 3

The following example shows Configuration Hub and Proficy Authentication in one computer and another computer with SCADA and the MQTT Client.



Example 4

The following deployment architecture illustrates Configuration Hub, Proficy Authentication, SCADA, and the MQTT Client are installed on separate computers.



Registration

Overview of MQTT Client Registration

The MQTT Client facilitates the connection of SCADA/HMI clients with MQTT brokers for communication with IoT devices. To configure the MQTT Client, ensure that Configuration Hub is installed within the SCADA network.

The MQTT Client product can be installed using Proficy installers. You can register the MQTT Client with Configuration Hub either during install or at a later time. Configuration Hub simplifies the registration of the MQTT Client plugin, centralizing control over MQTT Client product details, license activations, and certificate management. These enhancements replace the conventional method of registering the MQTT Client product, improving the user experience throughout the installation and registration processes.

This document outlines the steps for installing the MQTT Client 2024 Proficy installer and provides instructions on registering the MQTT Client product with Configuration Hub using Central Registration or Install Time Registration methods.

- **Central Registration**: This option allows you to centrally register the MQTT Client plugin with Configuration Hub from within Configuration Hub after installing MQTT Client. It does not require the prior installation of Configuration Hub and Proficy Authentication before installing MQTT Client.

  Note:
  If you choose the Central Registration method, configure the Node Manager utility by providing Proficy Authentication server details to update the MQTT Client with Proficy Authentication. For more details, refer to Central Registration for MQTT Client *(on page 1607)* steps.

- **Install Time Registration**: This option allows the MQTT Client to be registered with Configuration Hub during the installation process. The Install Time Registration method requires Configuration Hub and Proficy Authentication details before installing the MQTT Client.

  Note:
  If you choose the Install Time Registration method, ensure that Configuration Hub and Proficy Authentication server details are available before MQTT Client installation. For more details, refer to Install Time Registration for MQTT Client *(on page 1618)* steps.

Note:

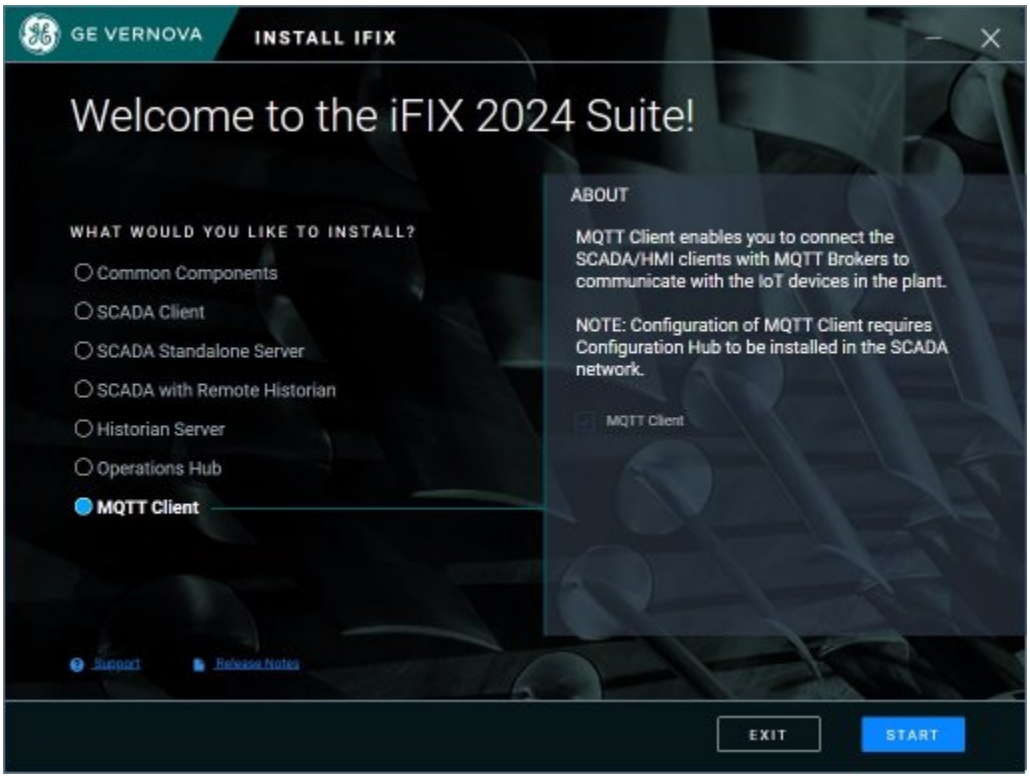
- You can unregister the MQTT Client plugin centrally within Configuration Hub, regardless of whether the product was initially registered using the Central Registration or Install Time Registration methods.
- To make use of the Central Registration and Install Time Registration enhancements, you must upgrade Configuration Hub and Proficy Authentication to version 2024 or higher.

Central Registration for MQTT Client

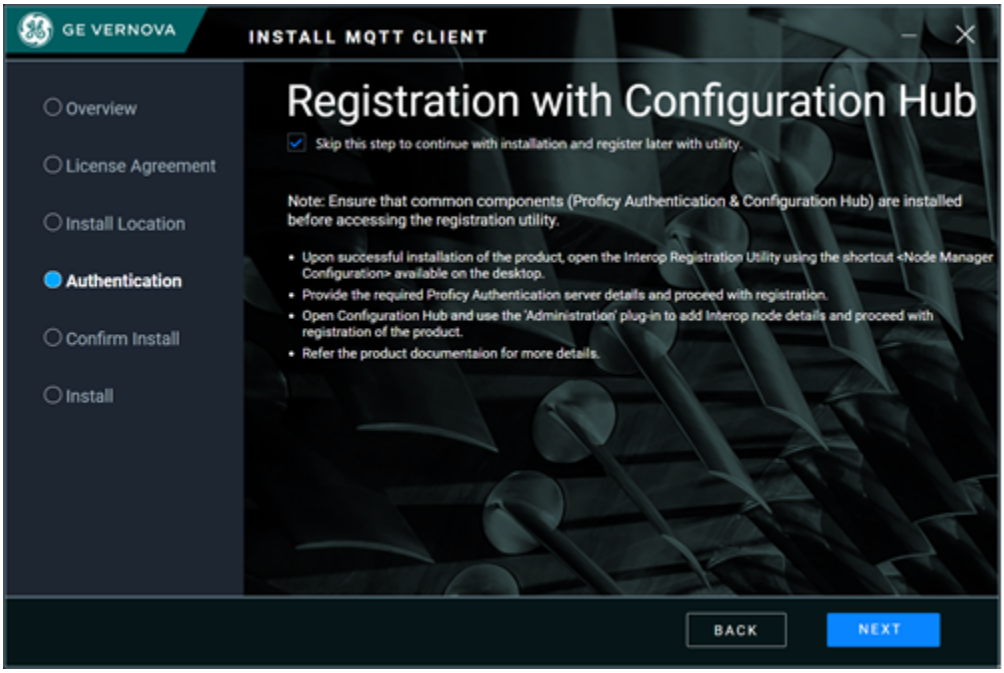
The Central Registration method allows you to complete the MQTT Client installation and register it with Configuration Hub either soon after installation or at a later time. During MQTT Client installation, you have the option to skip providing the Configuration Hub and Proficy Authentication server details. After a successful installation, use the Node Manager Configuration desktop shortcut (that is, Node Manager utility) to configure the Node Manager and update the MQTT Client with Proficy Authentication.

1. From the ISO folder, double-click the `.iso` file or select **Mount** from the context menu.
2. Double-click the **Setup.bat** file, which will launch the Proficy installer.

   For example, here with what the MQTT Client option that shows up on the iFIX install:



   The welcome screen for the MQTT Client appears.
3. Select **MQTT Client**, and then select **START**.
4. Select **ACCEPT** to proceed with the License Agreement.
5. Select **NEXT** to install the MQTT Client product in the default location `<Install_location>\Proficy` or click to modify the install location.
6. In the **Registration with Configuration Hub** screen, select **Skip this step to continue with installation and register later with utility** check box, and then select **NEXT**.



Important:
To proceed with the Central Registration process, you must skip providing Configuration Hub and Proficy Authentication server details.

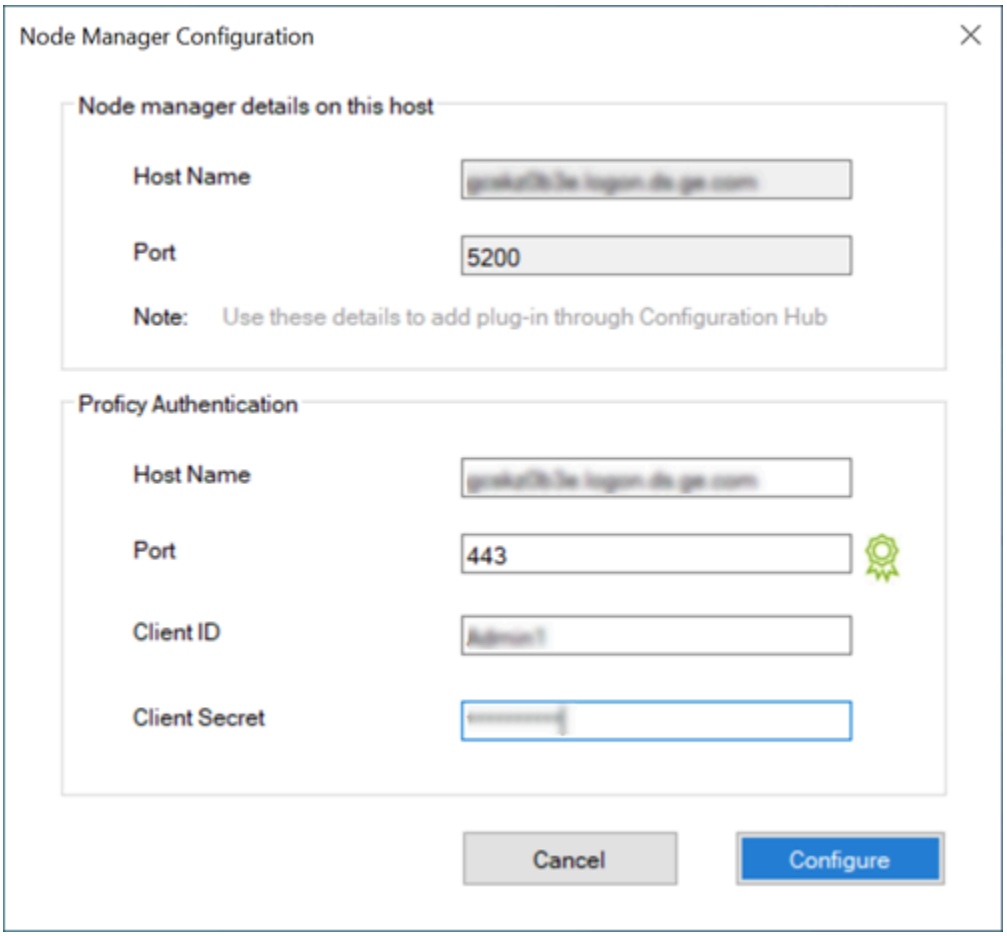
7. Select **START** in the **Confirm Install** screen to start the product installation.
   The MQTT Client product is installed in the `<install location\Program Files\Proficy>`.

Note:
During the MQTT Client installation, the License Client will also be installed silently.

8. Select **CLOSE**.
9. After successfully installing the MQTT Client product, you must restart your machine for the proper functioning of the MQTT Client software. Select **REBOOT NOW** to restart your machine.
10. After you restart the machine, ensure that Configuration Hub and Proficy Authentication are installed with version 2024 or upgraded to version 2024 or higher, as applicable on your machine.

Note:
You can install the Common components, which include Configuration Hub and Proficy Authentication, directly from the welcome screen of the MQTT Client (2024 and above), iFIX (2023 and above), or CIMPLICITY (2024 and above) Proficy installers.

11. Ensure that you set up Proficy Authentication in Configuration Hub. Refer to Set up Proficy Authentication *(on page 135)* for more details.
12. Double click the  **Node Manager Configuration** desktop shortcut (Node Manager utility). The **Node Manager Configuration** window appears.



13. Configure the Node Manager in the following sections:
    - **Proficy Authentication**
        - **Host Name:** The name of the Proficy Authentication server to which you want to update the product(s) with Proficy Authentication, in the <Fully Qualified Domain Name> format.
        - **Port:** The port number of the Proficy Authentication server.
        - **Client Id:** The client ID of the Proficy Authentication server, provided during the Proficy Authentication installation.
        - **Client Secret:** The client secret of the Proficy Authentication server, provided during the Proficy Authentication installation.

> **Note:**
> If the root certificate of the Proficy Authentication server is not trusted, then click not trusted  , the **Certificate Details** page appears. Select **Trust** to trust the root certificate.
>
> The root certificate is trusted  .

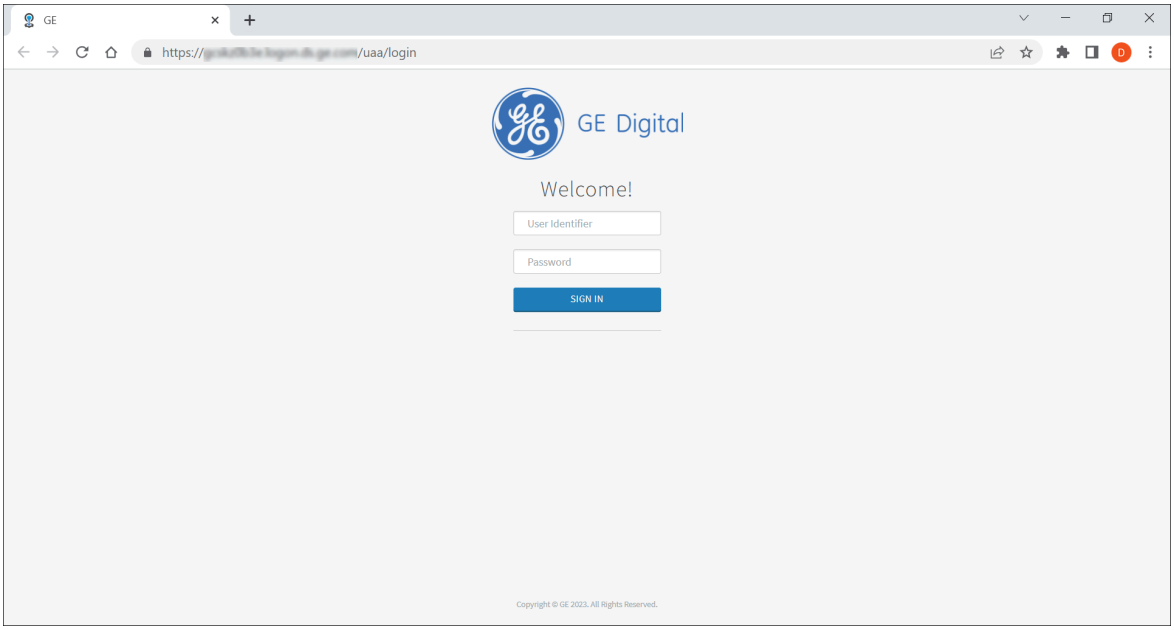
- **Node manager details on this host**
  - **Host Name:** The name of the node server where the product is installed, in the <Fully Qualified Domain Name> format. This field is automatically populated and disabled.
  - **Port:** The node manager port number where the product is installed. The port number field is disabled.

> **Note:**
> Ensure that you enter the same host details to integrate the MQTT Client plugin in Node Manager within Configuration Hub and proceed with the registration of the MQTT Client in Configuration Hub.

14. Select **Configure**.
    The following message appears.

    Successfully updated Proficy authentication for Products <MQTT Client installed>.

15. Double-click the  **Configuration Hub** desktop shortcut.

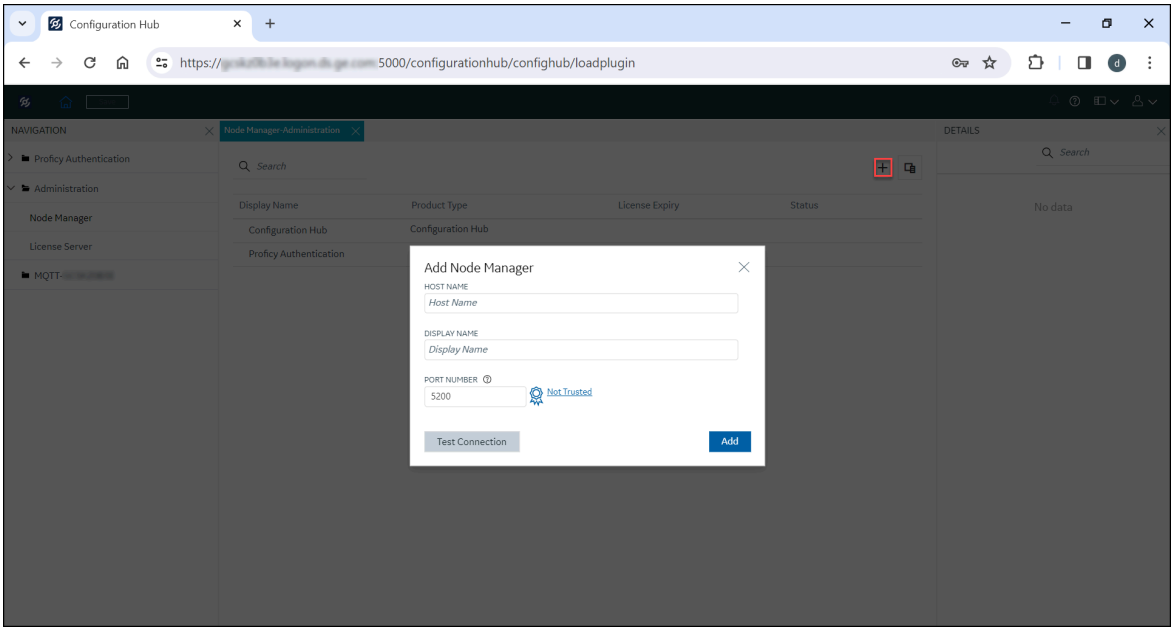


16. Enter the following credentials, and then select **SIGN IN**.
    - User Identifier: The default user id for first time users, that is, **ch_admin**.
    - Password: The password you entered in the **Client Secret** field in the Proficy Authentication section of the Node Manager Configuration window. Refer Step 13 *(on page 1610)*.

    The Configuration Hub user interface appears.

> **Note:**
> In the NAVIGATION panel, in Proficy Authentication, include the groups as required. Only the administrator with admin rights in **Security-Proficy Authentication** can provide user permissions to the groups. Refer to the **Proficy Authentication** help documentation for more details on managing Groups and Users to have access permissions.

17. In the NAVIGATION panel, select > **Administration** plugin.
    The Node Manager and License Server panels will appear.
18. Select **Node Manager**.
    The **Node Manager-Administration** panel appears displaying the Configuration Hub and Proficy Authentication product details.
19. Select + to add the Node Manager.



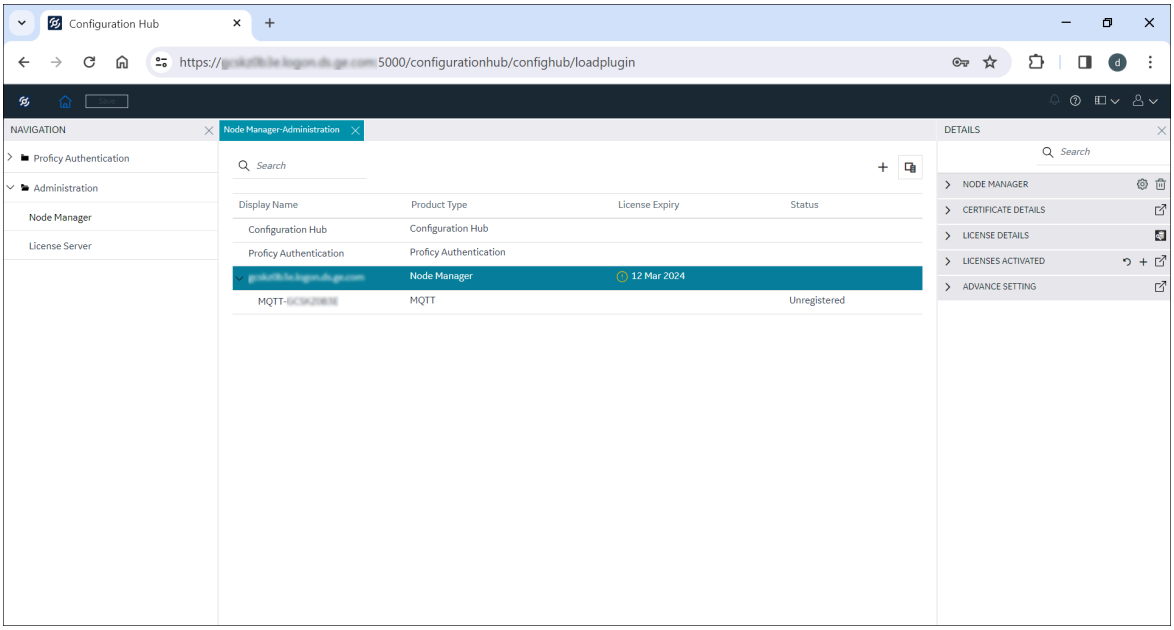
The **Add Node Manager** window appears. Enter the following details:

- **HOST NAME**: The name of the node server where the MQTT Client is installed. In the <Fully Qualified Domain Name> format.
- **DISPLAY NAME**: The display name is automatically populated, reflecting the host name field. You can choose to edit the display name as needed.
- **PORT NUMBER**: The node manager port number where the MQTT Client is installed.

> **Note:**
> The **HOST NAME** and **PORT NUMBER** details, as populated in the Node Manager Configuration window under the **Node Manager details on this host** section, must match the same details. Refer to Step 13 *(on page 1610)*.

> **Note:**
>
> If the root certificate of the Node Manager is not trusted, then click not trusted , the **Certificate Details** page appears. Select **Trust** to trust the root certificate.
>
> The root certificate is trusted .

20. Select **Add**.
    The *Node Manager added successfully* message appears.
21. Select the Node Manager row.

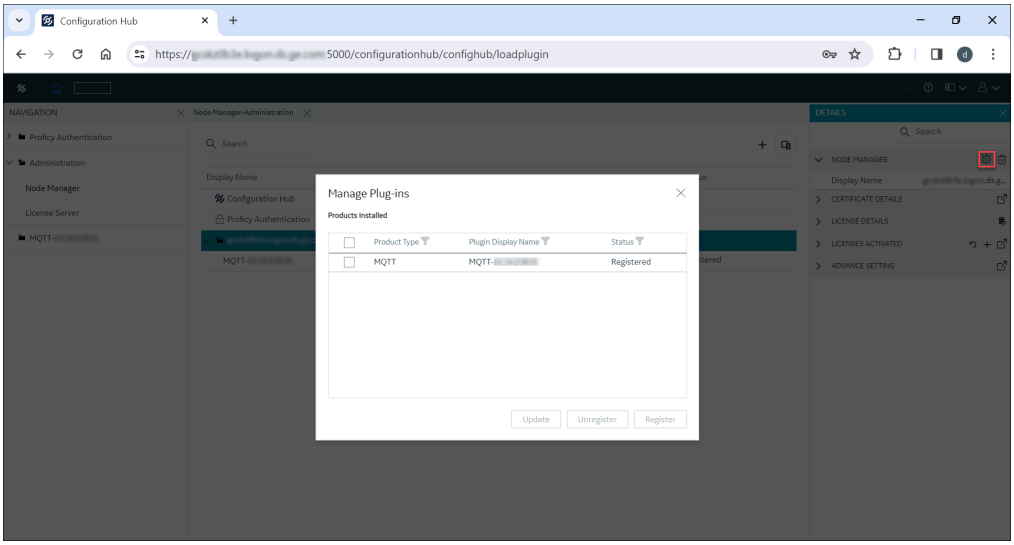


You can perform the following actions in the Node Manager section within the DETAILS panel:

- Select > of the **NODE MANAGER** and, if required, modify the Display Name field to update the Node Manager display name.

> **Note:**
> You can modify the Node Manager display name only after adding the Node Manager.

  - Select the **Manage** ⚙ button.

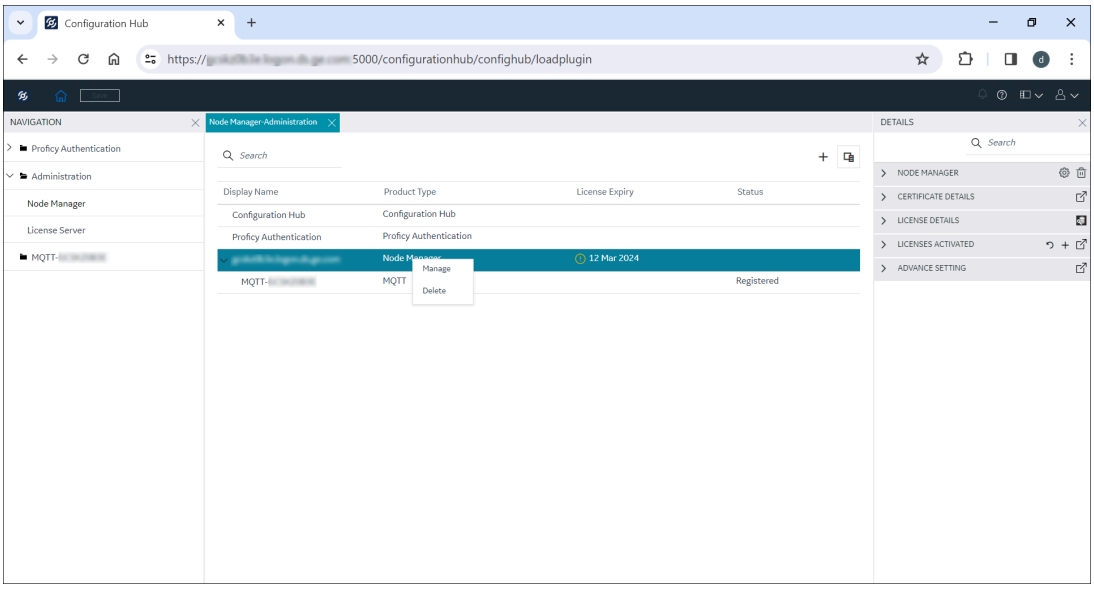


The **Manage Plug-ins** window appears displaying the **Products Installed**. Select the checkbox against the MQTT Client, and then select **Register** to register the MQTT Client product plugin to Configuration Hub, or **Unregister** to unregister the MQTT Client product plugin from Configuration Hub, or **Update** to modify the display name of the MQTT Client product plugin as required. Only after registering a product, the MQTT Client product plugin will appear in the NAVIGATION panel.

- Select the **Delete** button.

The **Delete Node Manager** window appears. If you select **Continue**, the Node Manager removes the MQTT Client product from the NAVIGATION panel. You will need to add the Node Manager again to operate the MQTT Client product plugin. Additionally, you can select the checkbox if you want to unregister the MQTT Client plugin on the selected node from Configuration Hub.

Note:
You can also right-click on the Node Manager panel row and select **Manage** or **Delete** as needed to perform actions similar to those in the Node Manager section within the DETAILS panel.



22. Select > of the Node Manager row from the Node manager panel.
    The list of Proficy product(s) installed on the node appears. Select the MQTT Client product row, the DETAILS panel display the MQTT Client product details. You can perform the following actions:

- Select > of the **PLUG-IN** and, if required, modify the Display Name field to update the MQTT Client plugin display name.

  Note:
  You can modify the MQTT Client plugin display name only after registering MQTT Client with Configuration Hub.

  - Select **Register** button.

    The **Register Plug-in** window appears. The PLUGIN HOST, PRODUCT TYPE, and DISPLAY NAME fields are auto populated. Select **Register** to register MQTT Client with Configuration Hub.

    The *<MQTT Client> Registered Successfully* message appears, and the MQTT Client product plugin is now listed in the NAVIGATION panel.

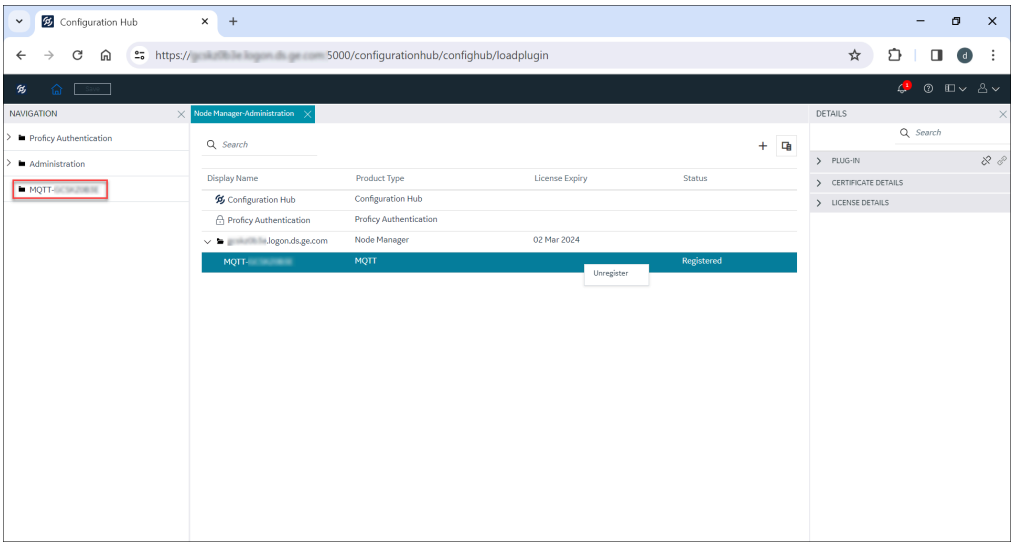
  - Select **Unregister** button.

    The **Unregister Plug-in** window appears. If you select **Continue** to unregister MQTT Client, the MQTT Client plugin will be removed from the NAVIGATION panel. Also, any open panel belonging to this plugin will be closed, and changes to the MQTT Client plugin will not be saved.

    Note:
    You can also right-click on the MQTT Client product row and select **Register** or **Unregister** as needed to perform actions similar to those in the PLUG-IN section within the DETAILS panel.

    If you select **Register**, the *<MQTT Client> Registered Successfully* message appears, and the MQTT Client product plugin is now listed in the NAVIGATION panel.

You can now enable your HMI/SCADA OPC UA clients to communicate with IoT devices and MQTT brokers by using MQTT Client.



23. If you are not licensed to use the MQTT Client, the MQTT Client will run in Demo mode for two hours, after which the following message will be displayed in the Configuration Hub user interface.

    Demo license expired. Restart the MQTTClient service.

    When you try to load the MQTT plugin connection, the following error message will be displayed.

    Service unavailable. Restart the MqttClient service.

    Perform the following steps to start the MQTT Client Service:

    - Right-click the Windows **Start** menu, and then click **Computer Management**.
    - Click **Services and Applications** and then, double-click **Services**.
    - Click **GE MQTT Client Service** and click **Start** to start the GE MQTT Client Service.

    After starting the GE MQTT Client Service, when you select <MQTT plugin name> in Configuration Hub, the **Connections-<MQTT plugin name>** panel will display the Demo license expiry time.

Important:
If you run the MQTT Client in Demo license mode, OPC UA write permissions are not supported. As a result, the OPC UA clients can only read the values of OPCUA tags but cannot write to or modify them.

Refer to the OPC UA for MQTT Clients *(on page 1663)* section for more information.

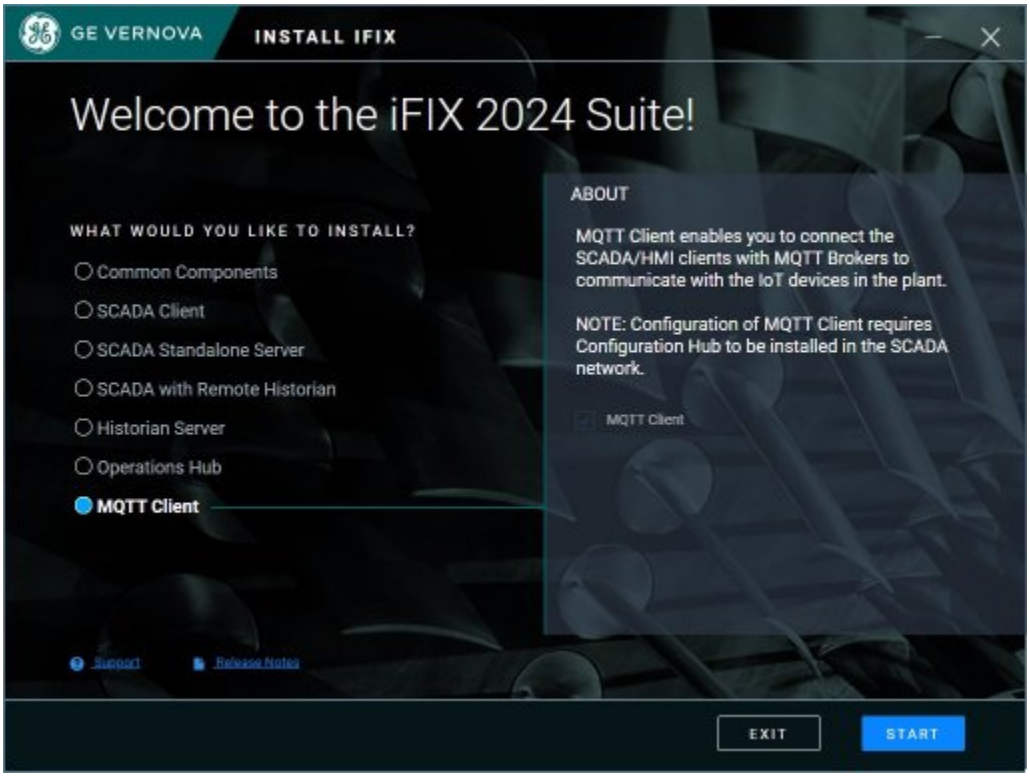
Install Time Registration for MQTT Client

If you choose to install MQTT Client using the Install Time Registration method, ensure that Configuration Hub and Proficy Authentication are installed before initiating MQTT Client installation. During the installation process, you will be prompted to provide both Configuration Hub and Proficy Authentication server details for MQTT Client registration with Configuration Hub and updating the product with Proficy Authentication. After a successful installation, the MQTT Client will automatically register with Configuration Hub and appear as a plugin in Configuration Hub.

Ensure that Configuration Hub and Proficy Authentication are installed with version 2024 or upgraded to version 2024 or higher, as applicable. You can install the Common components, which include Configuration Hub and Proficy Authentication, directly from the welcome screen of the MQTT Client 2024 Proficy installer.

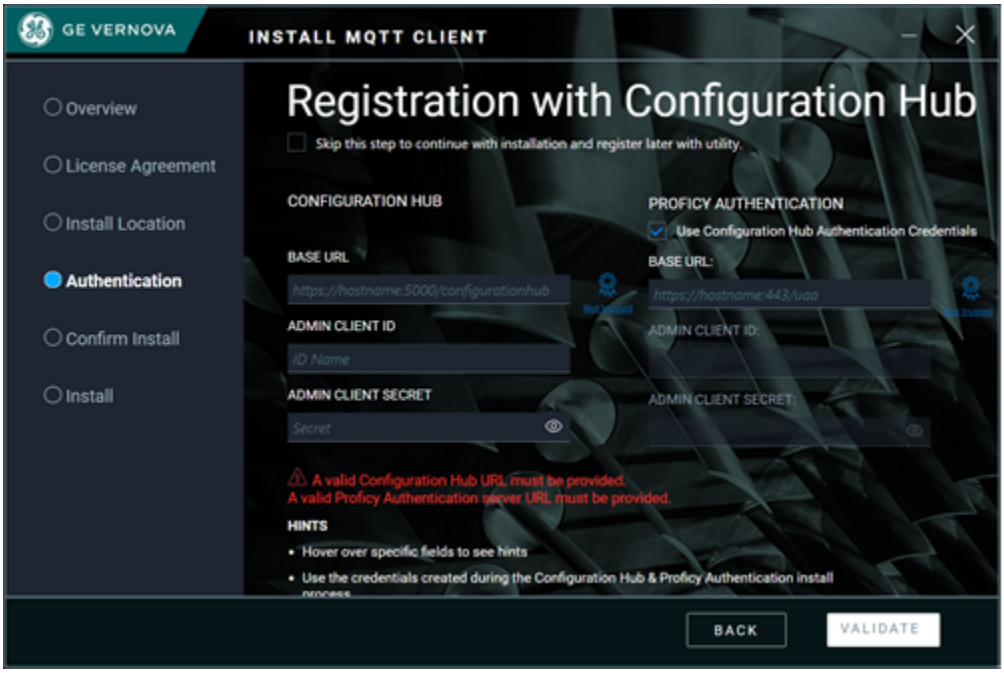
1. From the Proficy install media, double-click the `.iso` file or select **Mount** from the context menu.
2. Double-click the **Setup.bat** file, which will launch the Proficy installer.

   For example, here with what the MQTT Client option that shows up on the iFIX install:



The welcome screen for the Proficy installer appears.

3. Select **MQTT Client**, and then click **START**.
4. Select **ACCEPT** to proceed with the License Agreement.
5. Select **NEXT** to install the MQTT Client product in the default location `<Install_location>\Proficy` or click to modify the install location.
6. In the **Registration with Configuration Hub** screen, enter the Configuration Hub and Proficy Authentication server details.



7. In the **Configuration Hub** section, enter the following details:

Field	Description
BASE URL	Enter a valid base URL in the following format `https://hostname:<port number>/configurationhub` ◦ hostname: The name of the Configuration Hub server to which you want to register. In the <Fully Qualified Domain Name> format. ◦ <port number>: The port number of the Configuration Hub server to which you want to register. **Note:** ◦ Do not enter a slash at the end of the base URL. ◦ If the base URL indicates **Not trusted**, it means there is no trust established with the host, or the root certificate of Config-

Field	Description
	uration Hub server is incorrect. You must verify the base URL and enter a valid URL to establish the trust with the host and with the correct root certificate details.
ADMIN CLIENT ID	The admin client ID of the Configuration Hub server that you provided during the Configuration Hub installation.
ADMIN CLIENT SECRET	The admin client secret of the Configuration Hub server that you provided during the Configuration Hub installation.

8. In the **Proficy Authentication** section, enter the following details:

Field	Description
Use Configuration Hub Authentication Credentials	Select this check box if you entered the same credentials (Admin Client ID and Admin Client Secret) for both Configuration Hub and Proficy Authentication during installation.
BASE URL	Enter a valid base URL in the following format `https://hostname:<port number>/uaa` ◦ hostname: The name of the Configuration Hub server to which you want to register. In the <Fully Qualified Domain Name> format. ◦ <port number>: The port number of the Proficy Authentication server to which you want to register.

Field	Description
	Note: ◦ Do not enter a slash at the end of the base URL. ◦ If the base URL indicates **Not trusted**, it means there is no trust established with the host, or the root certificate of Proficy Authentication server is incorrect. You must verify the base URL and enter a valid URL to establish the trust with the host and with the correct root certificate details.
ADMIN CLIENT ID	The admin client ID of the Proficy Authentication server.
ADMIN CLIENT SECRET	The admin client secret of the Proficy Authentication server.

Note:
- You must enter valid Configuration Hub and Proficy Authentication server URL details, and also valid port numbers to establish the host connection.
- You must enter the credentials (Admin Client ID and Admin Client Secret) that were created during Configuration Hub and Proficy Authentication installation process.

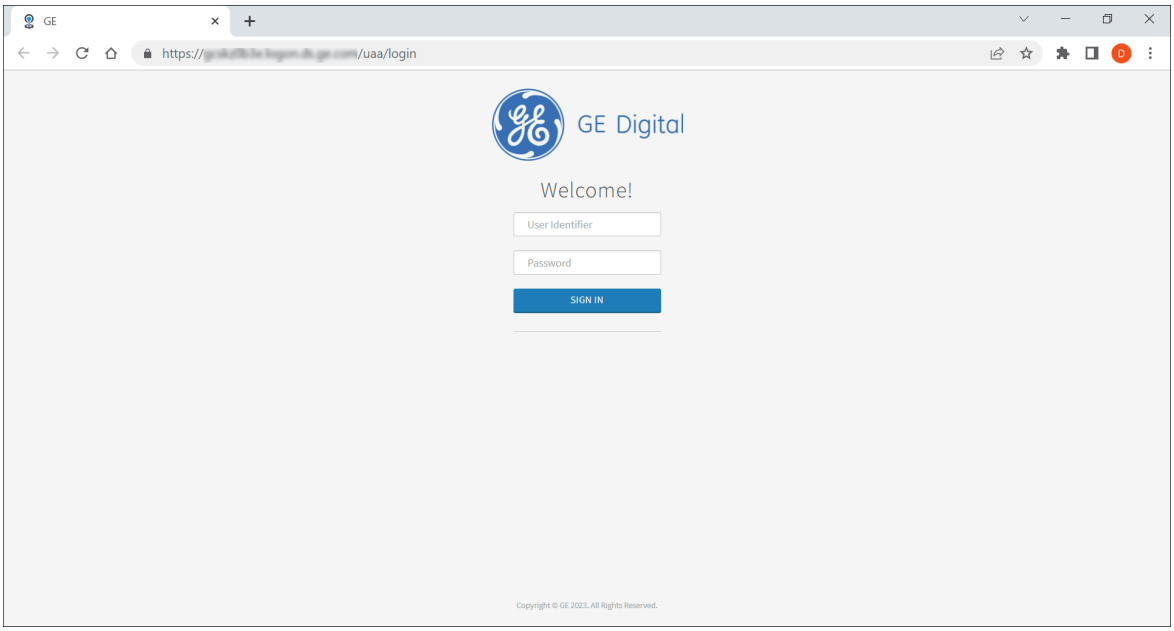
9. Select **VALIDATE**.

Note:
- The validate button will be enabled only if you enter all the mandatory fields and trust the root certificate.
- If the entered details are incorrect, the validation fails, and the Validate button will not be enabled. You cannot proceed further with the installation of MQTT Client until you enter the correct details in the fields.

10. Select **START** in the **Confirm Install** screen to start the MQTT Client installation.
    The MQTT Client is installed in the `<install location\Program Files\Proficy>`.

    > **Note:**
    > During the MQTT Client installation, the License Client will also be installed silently.

11. Select **CLOSE**.
12. After successfully installing the MQTT Client product, you must restart your machine for the proper functioning of the MQTT Client software. Select **REBOOT NOW** to restart your machine.
13. Ensure that you set up Proficy Authentication in Configuration Hub. Refer to Set up Proficy Authentication *(on page 135)* for more details.
14. Double-click the **Configuration Hub** desktop shortcut.

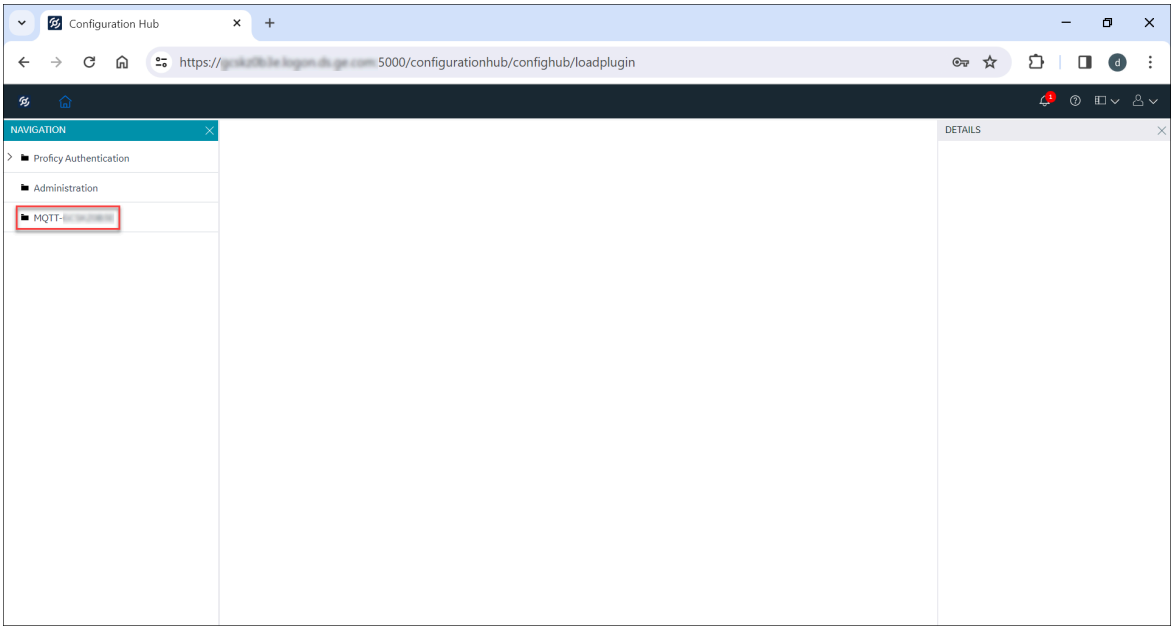


15. Enter the following credentials, and then select **SIGN IN**.
    - User Identifier: The default user id for first time users, that is, **ch_admin**.
    - Password: The password you entered in **Admin Client Secret** field during **Plug-in Registration Details** at Step 7 *(on page 1619)*.

    The Configuration Hub user interface appears, and the MQTT Client product, registered with Configuration Hub, automatically appears in the NAVIGATION panel as MQTT Client.

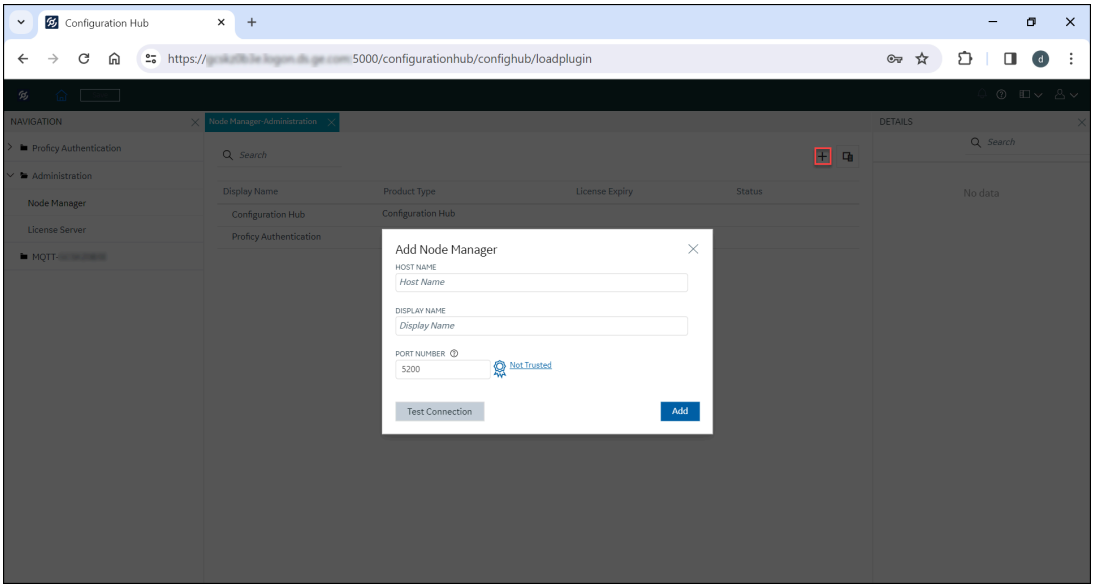
    > **Note:**
    > In the NAVIGATION panel, in Proficy Authentication, include the groups as required. Only the administrator with admin rights in **Security-Proficy Authentication** can provide user

permissions to the groups. Refer to the **Proficy Authentication** help documentation for more details on managing Groups and Users to have access permissions.



16. In the NAVIGATION panel, select > **Administration** plugin.
    The Node Manager and License Server panels will appear.
17. Select **Node Manager**.
    The **Node Manager-Administration** panel appears, displaying the Configuration Hub and Proficy Authentication product details. Additionally, the Node Manager row is automatically added to the panel, when you install the MQTT Client product using the Install Time Registration method.
18. If the Node Manager row unexpectedly fails to appear in the **Node Manager-Administration** panel, then you must perform the following steps to add the Node Manager to the panel; otherwise, continue with Step 20 *(on page 1625)*.

a. Select + to add the Node Manager.



The **Add Node Manager** window appears. Enter the following details:

- **HOST NAME:** The name of the node server where the MQTT Client is installed. In the <Fully Qualified Domain Name> format.
- **DISPLAY NAME:** The display name is automatically populated, reflecting the host name field. You can choose to edit the display name as needed.
- **PORT NUMBER:** The node manager port number where the MQTT Client is installed.

Note:

If the root certificate of the Node Manager is not trusted, then click not trusted , the **Certificate Details** page appears. Select **Trust** to trust the root certificate.

The root certificate is trusted .

b. Select **Add**.

The *Node Manager added successfully* message appears.

19. Select > of the Node Manager row.

The list of Proficy product(s) installed on the node appears. Select the MQTT Client product row, the DETAILS panel display the MQTT Client product details. You can perform the following actions:

- **PLUG-IN:** Select > of the **PLUG-IN** and, if required, edit the Display Name field to update the MQTT Client product plugin display name.
  - Select the **Unregister** button.

    The **Unregister Plug-in** window appears. If you select **Continue** to unregister the MQTT Client, the MQTT Client plugin will be removed from the NAVIGATION panel. Also, any open panel belonging to this MQTT Client plugin will be closed, and changes to the MQTT Client plugin will not be saved.

    > **Note:**
    > You can modify the MQTT Client product plugin display name only after registering the MQTT Client with Configuration Hub.

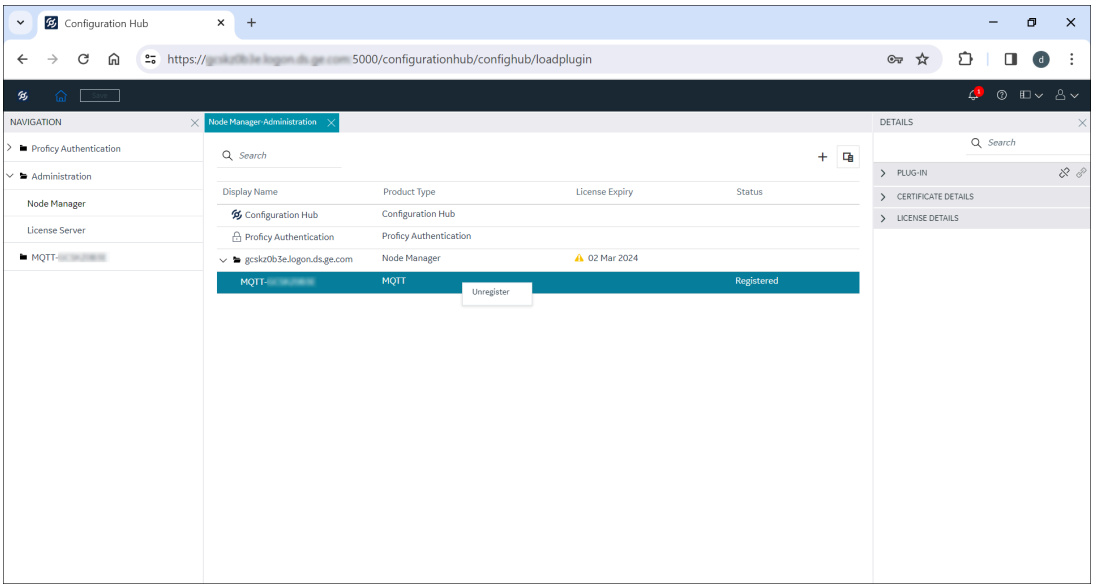
  - Select the **Register** button.

    The **Register Plug-in** window appears. The PLUGIN HOST, PRODUCT TYPE, and DISPLAY NAME fields are auto populated. Select **Register** to register the MQTT Client with Configuration Hub.

    The *MQTT Client Registered Successfully* message appears, and the MQTT Client product plugin is now listed in the NAVIGATION panel.

    You can now enable your HMI/SCADA OPC UA clients to communicate with IoT devices and MQTT brokers by using MQTT Client.

> **Note:**
> You can also right-click on the MQTT Client product row and select **Unregister** or **Register** as needed to perform actions similar to those in the PLUG-IN section within the DETAILS panel.



20. If you are not licensed to use the MQTT Client, the MQTT Client will run in Demo mode for two hours, after which the following message will be displayed in the Configuration Hub user interface.

    Demo license expired. Restart the MQTTClient service.

    When you try to load the MQTT plugin connection, the following error message will be displayed.

    Service unavailable. Restart the MqttClient service.

    Perform the following steps to start the MQTT Client Service:

    - Right-click the Windows **Start** menu, and then click **Computer Management**.
    - Click **Services and Applications** and then, double-click **Services**.
    - Click **GE MQTT Client Service** and click **Start** to start the GE MQTT Client Service.

After starting the GE MQTT Client Service, when you select the MQTT Client plugin in Configuration Hub, the **Connections-<MQTT plugin name>** panel will display the Demo license expiry time.

Important:
If you run the MQTT Client in Demo license mode, OPC UA write permissions are not supported. As a result, the OPC UA clients can only read the values of OPCUA tags but cannot write to or modify them.

Configuration

MQTT Client Configuration

Use the following steps to configure the MQTT connections in the Configuration Hub.

1. Manage Identity Providers, Groups, and Users *(on page 1628)*.
2. Add MQTT Server for Broker Connection *(on page 1630)*.
3. Add Subscriptions to Broker Connection *(on page 1636)*.
4. Add Tags to Subscription *(on page 1647)*.

Manage Identity Providers, Groups, and Users

By default, the user name *ch_admin* is created in the Proficy Authentication server after registering MQTT Client with the Configuration Hub server. For the first time, you can log in to the Configuration Hub user interface using this username (the password will be the same as the Proficy Authentication secret). After you log in to Configuration Hub, as an administrator, navigate to **Proficy Authentication > Security**. Depending on the groups assigned to the user, the user will have permissions to access the MQTT client configuration.

Select the user to whom you want to assign a group membership. The **DETAILS** section displays the details of the user. Click **GROUP MEMBERSHIP** ; the group membership window displays the list of available groups that can be assigned to the user. Depending on the groups assigned, the user will have scope to access MQTT client configuration. Only the administrator with admin rights in **Security-Proficy Authentication** can provide user permissions to the groups.

Refer to the **Proficy Authentication** help documentation for more details on managing Groups and Users.

For more information on MQTT groups and access provisions, refer to MQTT Groups in Proficy Authentication *(on page 1629)*.

MQTT Groups in Proficy Authentication

Proficy Authentication provides group membership access for MQTT clients, such that the users can access the MQTT client configuration from Configuration Hub and read/write OPC UA data.

Table 60. Group Membership

MQTT Group Membership	Access Provision
protocoltranslators.mqtt.<PLUG-IN ALIAS NAME>.config.read	Retrieve the list of broker, subscriptions, and tags on the specific MQTT client node that has the Alias name registered with Configuration Hub.
protocoltranslators.mqtt.<PLUG-IN ALIAS NAME>.config.write	• Retrieve/modify/add/delete the list of broker, subscriptions, and tags on the specific MQTT client node that has that Alias name registered with Configuration Hub. • Save and Publish the data.
protocoltranslators.mqtt.<PLUG-IN ALIAS NAME>.opcua.read	This group provides read access to OPC UA clients, so that the OPC UA clients can connect to the MQTT OPC UA server and read the OPC UA data on the specific node.
protocoltranslators.mqtt.<PLUG-IN ALIAS NAME>.opcua.write	This group provides read/write access to OPC UA clients, so that the OPC UA clients can connect to the MQTT OPC UA server and read/write the OPC UA data on the specific node.

Note:

The following groups are shared access groups that provide access to all MQTT client nodes on the network.

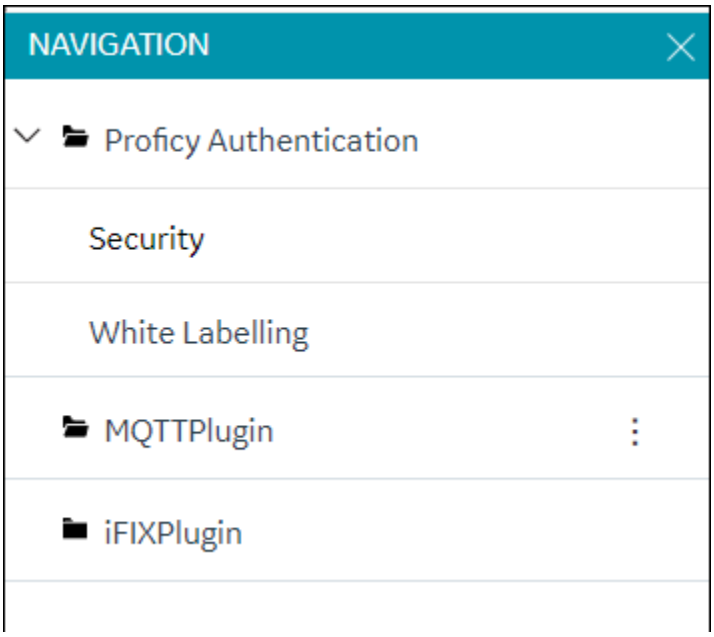
- **protocoltranslators.mqtt.shared.config.read**
- **protocoltranslators.mqtt.shared.config.write**
- **protocoltranslators.mqtt.shared.opcua.read**
- **protocoltranslators.mqtt.shared.opcua.write**

Important:
If the groups are not assigned to the user, the MQTT plugin connection will not load any data. Shared access groups are added by default to the **ch_admin** user during plugin registration.

Add MQTT Server for Broker Connection

MQTT Plugin for Broker connections are edited in the **DETAILS** section. After selecting a server configuration in the **Connections** panel, the **DETAILS** section populates the broker details such as server details, reconnect parameters, and so on.

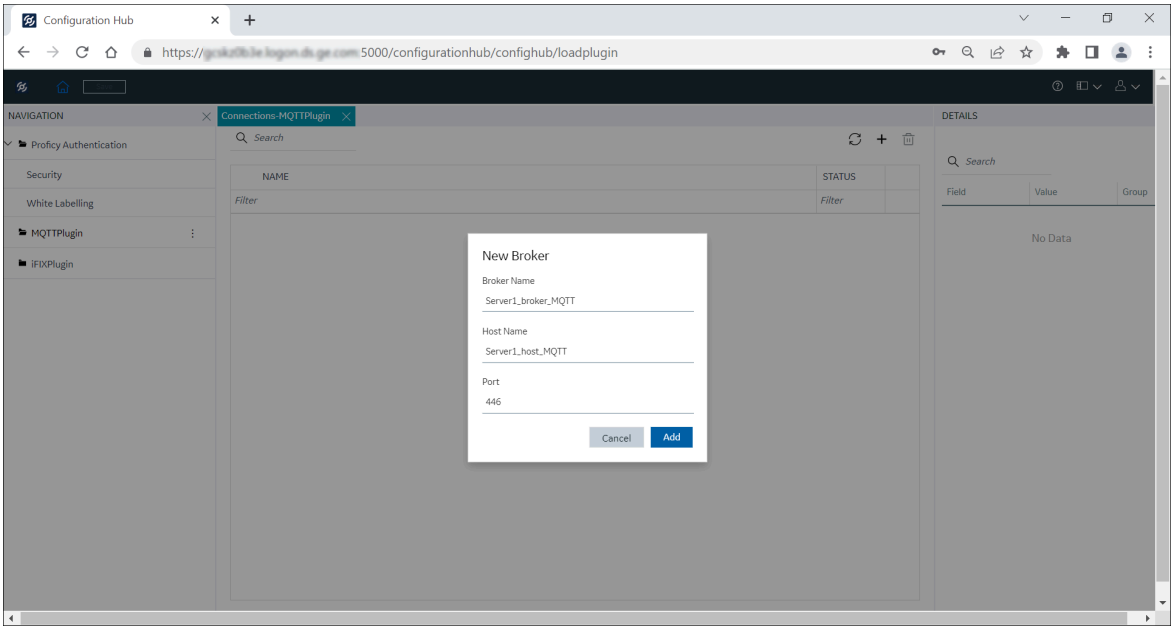
To add the Server for Broker Connection, you must log into Configuration Hub with Proficy Authentication credentials. After you login, the enabled connections appear in the **Navigation** panel.



To add the Server for Broker Connection:

1. Click + to add a new broker.

   The **New Broker** dialog appears.

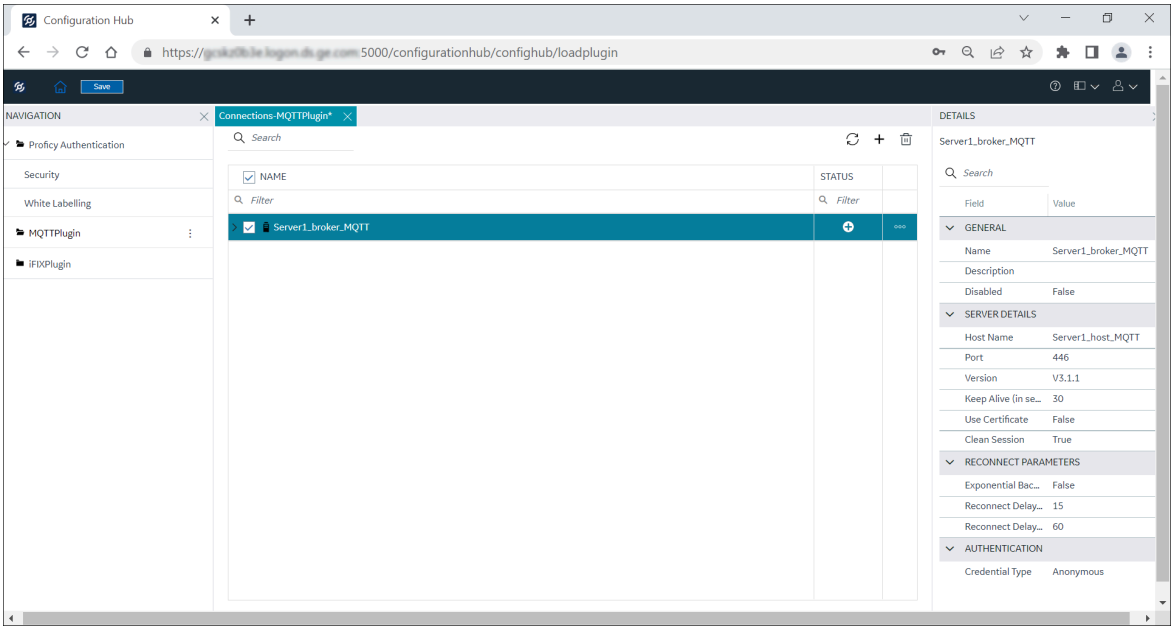


2. Enter the **Broker Name**, **Host Name**, and **Port**. Click **Add**.

Note:

- Adhere to the following rules when entering information:
  - The broker name must start with a letter and cannot exceed 255 characters.
  - Do not include spaces in between names.
  - Names cannot have leading or trailing spaces.
  - The only special characters allowed in the broker name are '-' and '_'.
  - All special characters and numbers are allowed in a Host name. Spaces are not allowed.
  - The port name field cannot include letters. The port number must be in the range 1 to 65535.
  - Field names cannot be left blank. Duplicate names are not allowed.

The new broker is added, and the broker details are displayed in the **DETAILS** section. Click **Save**.



3. Edit the broker in the **DETAILS** section as required.

Table 61. MQTT Server Details

Field	Value
GENERAL	
Name	Enter a name for the broker connection.
Description	Enter the description for the broker connection.
Disabled	You can enable or disable the broker connection with the client. ◦ **True**: The client is disabled from connecting to the MQTT broker. ◦ **False**: The client is enabled to connect to the MQTT broker. This is the default value.
SERVER DETAILS	
Host Name	Host name of the server on which the MQTT broker is installed.
Port	The port number of the MQTT broker.

Field	Value
Version	The MQTT version (V5 or, V3.1.1 or, V3.1) used to connect to the MQTT broker.
Keep Alive (in seconds)	When there is no exchange of messages or no data flow between the client and the broker for a certain time period, the client will generate a PING request to the broker and the broker will reciprocate by sending a PING response to the client. This confirms the connection is active and the time period to confirm the active connection is the *Keep Alive* period. By default, the *Keep Alive* period is set to 30 seconds. You can modify the *Keep Alive* default value as required to establish the connection.
Use Certificate	To establish a secure connection with the broker, you must import the broker certificate and trust the certificate. ◦ If set to **True**, the following message appears: *'Use certificate' field is set to true, Please upload your certificate by clicking on 'Import certificate' option in the broker context menu.* This indicates that you must import the certificate to enable a secure connection with the MQTT broker. Refer to Secure Connection with Broker *(on page 1654)* to import the certificate. Similarly, the MQTT broker must import the client certificate to enable a secure connection with the client. Refer to the broker documentation to import the client certificate. The MQTT Client root certificate is avail-

Field	Value
	able at `<Installation Path>/Pki/own/MqttClientRootCA.crt` ◦ If set to **False**, the MQTT broker connection is not secured.
Clean Session	◦ **True**: The broker does not store any information about the client and disconnects the existing session (for the topic subscribed). However, a new session will be created, and this session will remain active until the network connection is active. The client must re-subscribe to the topics in the new session. This is the default value. ◦ **False**: The broker stores the client information for the topic subscribed so that when the client disconnects and reconnects, the client does not have to re-subscribe to the topics because the information is stored by the broker. Also, the broker stores the QoS1 and QoS2 messages subscribed to by the client when the session is disconnected.
Session Expiry Interval	The Session Expiry Interval is the period after disconnection (client to broker or, broker to client session) during which the messages are persisted. **Note:** The Session Expiry Interval is applicable only when you connect to the broker using MQTT version V5, and if the Clean Session is set to **False**.
RECONNECT PARAMETERS	

Field	Value
Exponential BackOff	The Exponential Backoff helps minimize the number of retries during the connection establishment process. ◦ **True**: Requests or retries to reconnect to the broker are sent as the time increases exponentially. ◦ **False**: Requests are sent according to the reconnect delay parameters.
Reconnect Delay (in seconds)	By default, the Reconnect Delay value is set to 15 seconds. That means, after a connection fails to the server, reconnection to the server will connect every 15 seconds.
Reconnect Delay Max (in seconds)	By default, the reconnect delay maximum value is set to 60 seconds. That means reconnection is attempted as per the values specified in **Reconnect Delay** until the **Reconnect Delay Max** is reached. Subsequently, the reconnection is attempted at the interval specified in the **Reconnect Delay Max** parameter.
AUTHENTICATION	
Credential Type	Valid entries are: ◦ Anonymous ◦ UserName/Password ◦ PreShared Key It is recommended that you select UserName/Password or PreShared Key to provide optimum security. If the UserName/Password

Field	Value
	option is selected, enter the username and password to connect to the MQTT server. **Note:** The Anonymous credential type does not provide any access protection for the data.

After editing the broker details, the **Save** button on the toolbar is enabled to indicate that the Connections panel has changes to be saved. By clicking the **Save** button, the changes made to broker connections are persisted until the changes are published to the MQTT node.

In addition to editing a broker connection, the connection panel supports creating subscriptions under the broker connections. For more details, refer to Add Subscriptions to Broker Connection *(on page 1636)*.

Add Subscriptions to Broker Connection

Subscriptions are created under the Broker(s) to subscribe to the data parameters.

The following subscription types are supported:

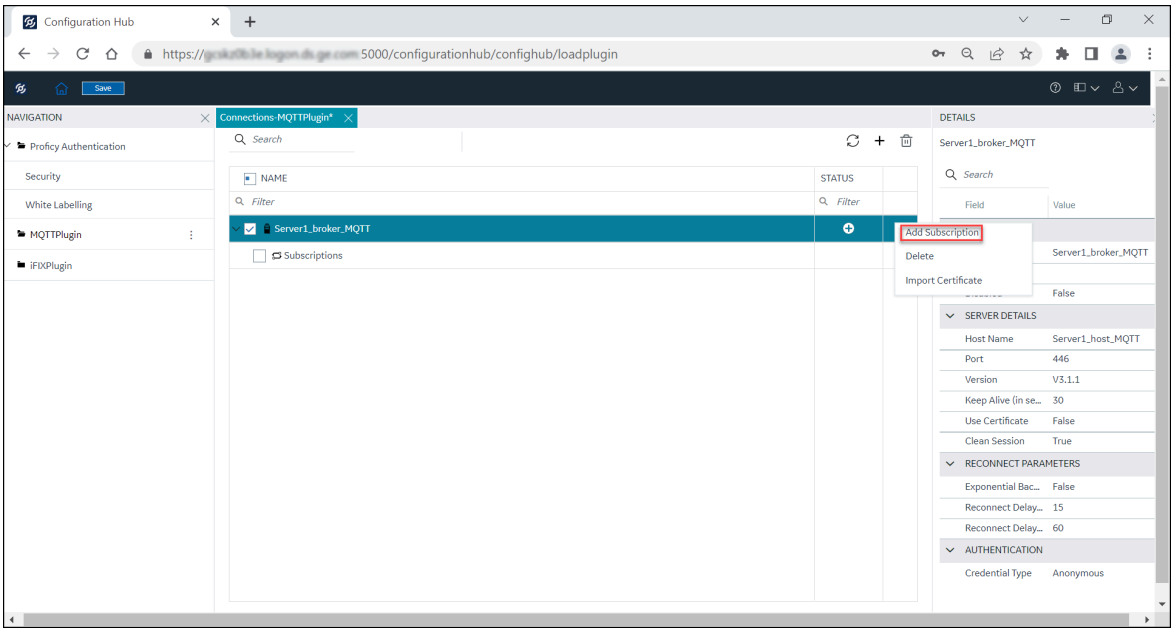
1. JSON
2. Sparkplug-B

Note:
Depending on the IoT data received from the client, you can select the JSON or Sparkplug subscription type.

A subscription is added to a broker connection and a tag is added to a subscription.

To add a Subscription to a Broker Connection:

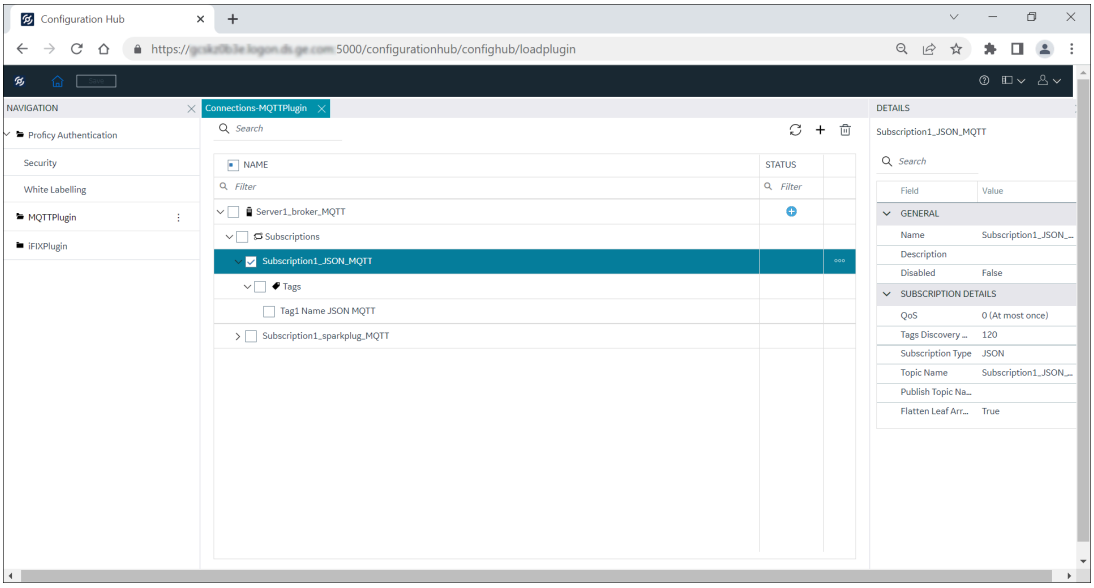
1. Select **Add Subscription**.



   The **New Subscription** dialog appears.

2. Select **Subscription Type** (JSON or Sparkplug Bv1.0).
   - If you select JSON, enter a **Subscription Name**, and a **Topic Name**, and then click **Add**.

> **Note:**
>
> - Adhere to the following rules when entering information:
>   - Do not include spaces in between the names.
>   - Names cannot have leading or trailing spaces.
>   - The only special characters allowed are '_' and '-'.
>   - Subscription names must start with a letter.
>   - Field names cannot be blank. Duplicate names are not allowed.
>   - Subscription names cannot exceed 255 bytes.

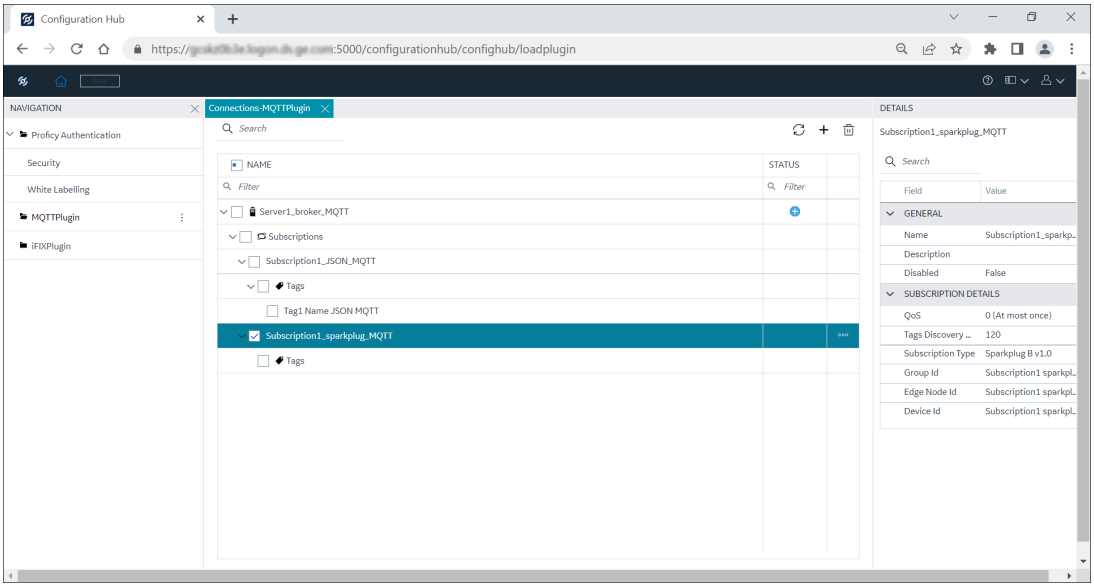


The JSON subscription is added to the broker connection. Click **Save**.

- If you select Sparkplug, enter **Subscription Name**, **Group Id**, **Edge Node Id**, and **Device Id**, and then click **Add**.

Note:

- Adhere to the following rules when entering information:
  - Subscription names must start with a letter and cannot exceed 255 characters.
  - The only special characters allowed are '_' and '-'.
  - Do not include spaces in between the names.
  - Names cannot have leading or trailing spaces.
  - For *Group Id* and *Edge Node Id*, the special characters **+** and **#** are not allowed.
  - Field names cannot be left blank (the *Device Id* field can be left blank if the subscription is for an Edge Node). Duplicate names are not allowed.



The Sparkplug subscription is added to the broker connection. Click **Save**.

Table 62. Subscription Details

Field	Value
GENERAL	
Name	Enter a name for the subscription.
Description	Enter the description for the subscription.
Disabled	Enables or disables the subscription with the client: ▪ **True**: The subscription is disabled. ▪ **False**: The subscription is enabled.
SUBSCRIPTION DETAILS	
QoS	The Quality of Service (QoS) specifies three levels (QoS0, QoS1, and QoS2) at which the messages are delivered between the publishing client (sender) to the broker (receiver) and from the broker (sender) to the subscribing client (receiver). The QoS level selection provides easy communication even when the network is not reliable.

Field	Value
	▪ QoS0: At most once ▪ No assurance of message delivery. ▪ Best efforts to deliver message only once. ▪ No acknowledgement receipt of the message from the receiver, message is not transmitted back to the sender, and the message is not stored. ▪ QoS1: At least once ▪ Ensures message delivery at least once to the receiver. ▪ Does not prevent delivering the messages multiple times to the receiver. ▪ Receiver acknowledges the message, and the sender stores the message. ▪ QoS2: Exactly once ▪ Ensures each message is delivered to the receiver only once. ▪ Receiver confirms the message delivery for each message from the sender. ▪ Requires two request/response flows between the sender and the receiver. ▪ Receiver acknowledges the message, and the sender stores the messages. ▪ Acknowledgement of delivered messages are received

Field	Value
	by the sender until the published messages are available to use. **Note:** QoS2 level is most reliable, but the quality of service is slower than QoS0 and QoS1.
Tags Discovery Duration (in sec)	The Tags Discovery Duration is the duration period to fetch the tags. Tags fetched after the discovery are then added to the topic subscribed. This parameter helps the user to dynamically fetch the tags for a specific topic name and for a specific time duration. By default, the tags discovery duration is set to 120 seconds. You can modify the value as required. **Note:** ▪ You can select **Start Tag Discovery**, **Stop Tag Discovery**, and **Show Discovered Tags** by using the overflow icon ⋮, next to the subscription. ▪ If you select **Start Tag Discovery**, the Time Remaining in seconds is displayed. ▪ After the time remaining ends, or if you prematurely stop the tag discovery, select **Show Discovered Tags** to view the published tags. You can modify the Data Type and Read Write parameters. If modified, select the spe-

Field	Value
	cific tag, and then click **Add** to view the modified tag to the tags list for the topic subscribed.
Subscription Type	Displays the subscription type.
JSON Subscription	
Topic Name	Enter a topic name to which you want to subscribe. **Example:** ▪ Entering **test1/#** indicates that the client can listen to any topic that starts with test1/. **Note:** The character # is a key word that has to be the last value. You can choose to enter any topic name in place of the key word # to differentiate multiple topics. That is, if you enter test1/test2, the client can listen explicitly to test1/test2. ▪ Entering **test1/+/temperature** indicates that the client can listen to any topic name used in place of + to differentiate a single topic. **Note:** The character + is a key word between test1 and temperature. If you enter test1/

Field	Value
	test2/temperature, the client can listen explicitly to test1/test2/temperature.
Publish Topic Name	Publish Topic Name, if provided by the user, will be used by the MQTT client when publishing the data; that is, when a user writes to a specific tag in the subscription using the OPC UA client, the data will be published with that specific publish topic name. **Note:** If the Publish Topic Name field is left empty, then no data will be published to the broker even though the user modifies on the OPC UA side.
Flatten Leaf Arrays	The Flatten Leaf Array parameter is used to consider the array tags as a whole or flatten the tag arrays (for example, if you have 100 elements in a JSON array, then you can choose to create a single array tag or, create 100 unique tags each pointing to an array element). By default, Flatten Leaf Arrays is set to True. ▪ True: A unique tag for each element of the array will be created. ▪ False: A single array tag for all the elements will be created. Also, the **Configure Leaf Array Elements** are enabled to configure the respective tag elements in **TAG DETAILS** section.

Field	Value
	Note: The **Configure Leaf Array Elements** (that is, Leaf Array Rank, Leaf Array Dimensions, and Leaf Array Data Type) are able to be configured only if the **Data Type** is set to **DataSet**.
Sparkplug Subscription	
Group Id	Enter a Group Id for the topic subscribed.
Edge Node Id	Enter an Edge Node Id for the topic subscribed.
Device Id	Enter a Device Id for the topic subscribed. The topic device id is the identification of a device attached to the MQTT Edge node. The device id field is optional. **Note:** ▪ If the Device ID field is left empty, it will be considered an Edge node. ▪ If you enter the Device ID field, it will be considered as a Device node.

Important:
After configuring the changes, click **Save** to save the connection parameters.

Any application requesting the data from the MQTT broker is subscribed to the JSON or Sparkplug type depending on the data loaded from the IoT.

Tags are added under the Subscriptions to store specific data from the subscription. Refer to Add Tags to Subscription *(on page 1647)* to add Tags under each Subscription.

JSON Supported Payload

The JSON payload must have the root as a JSON object. Other root types are not supported.

The following are examples of JSON supported payloads:

Simple JSON

```
{
 "IntVal":56,
 "DoubleVal":2.9574e58,
 "BoolVal":false,
 "StringVal":"this is a string"
}
```

In the above payload, the tags created are *IntVal*, *DoubleVal*, *BoolVal*, and *StringVal*.

Nested JSON

```
{
 "IntVal":56,
 "DoubleVal":2.9574e58,
 "BoolVal":false,
 "StringVal":"this is a string",
 "parent/child":-88,
 "FirstLeve1Obj":{
  "IntVal":56,
  "DoubleVal":2.9574e58,
  "BoolVal":false,
  "StringVal":"this is a string",
  "SecondLevelObj":{
   "IntVal":56,
   "DoubleVal":2.9574e58,
   "BoolVal":false,
   "StringVal":"this is a string"
  }
 }
}
```

In the above payload, the tags created are: *IntVal, DoubleVal, BoolVal, StringVal, parent/child, FirstLeve1Obj/IntVal, FirstLeve1Obj/DoubleVal, FirstLeve1Obj/BoolVal, FirstLeve1Obj/StringVal, FirstLeve1Obj/SecondLevelObj/IntVal, FirstLeve1Obj/SecondLevelObj/DoubleVal, FirstLeve1Obj/SecondLevelObj/BoolVal,* and *FirstLeve1Obj/SecondLevelObj/StringVal*.

- The `Is Hierarchical` parameter in the *parent/child* tag must be set to **False** to indicate that it is not a nested level tag.
- The `Is Hierarchical` parameter in the tags starting with *FirstLeve1Obj* and *FirstLeve1Obj/SecondLeve1Obj* must be set to **True** to indicate that they are nested level tags. The '/' is considered a delimiter that separates the first level *parent* and the second level *child* tags.

JSON Payload with Arrays

```
{
 "FirstLevelObj":{
  "ObjArrayVars":[
   {
    "Name": "my name",
    "Age": 30,
    "Languages":["English", "Hindi", "Telugu"]
   },
   {
    "Name": "your name",
    "Age": 20,
    "Languages":["Spanish", "French", "Latin"]
   }
  ],
  "IntArrayVars":[10, 20, 30]
 },
 "MultiDimArray":[[56.54, 23.45],[100.4,23.45]]
}
```

There are two different ways in which the arrays are considered:

- Each element of the array as an individual tag.
- Entire array as a single array tag.

The Flatten Leaf Arrays parameter of the Subscription determines whether to consider the array as a single array tag or to flatten the individual elements into tags.

If `Flatten Leaf Arrays` is set to **True**, the tags for the above payload are created as: *FirstLevelObj/ObjArrayVars[0]/Name, FirstLevelObj/ObjArrayVars[0]/Age, FirstLevelObj/ObjArrayVars[0]/Languages[0], FirstLevelObj/ObjArrayVars[0]/Languages[1], FirstLevelObj/ObjArrayVars[0]/Languages[2], FirstLevelObj/ObjArrayVars[1]/Name, FirstLevelObj/ObjArrayVars[1]/Age, FirstLevelObj/ObjArrayVars[1]/Languages[0], FirstLevelObj/ObjArrayVars[1]/Languages[1], FirstLevelObj/ObjArrayVars[1]/Languages[2], FirstLevelObj/IntArrayVars[0],FirstLevelObj/IntArrayVars[1],FirstLevelObj/IntArrayVars[2], MultiDimArray[0][0], MultiDimArray[0][1], MultiDimArray[1][0], MultiDimArray[1][1]*

If you set Flatten Leaf Arrays to **True**, values written from OPC UA clients to the tags cannot be published back to the MQTT client.

If you set `Flatten Leaf Arrays` to **False**, the tags for the above payload are created as: *FirstLevelObj/ObjArrayVars[0]/Name, FirstLevelObj/ObjArrayVars[0]/Age, FirstLevelObj/ObjArrayVars[0]/Languages, FirstLevelObj/ObjArrayVars[1]/Name, FirstLevelObj/ObjArrayVars[1]/Age, FirstLevelObj/ObjArrayVars[1]/Languages, FirstLevelObj/IntArrayVars, MultiDimArray*

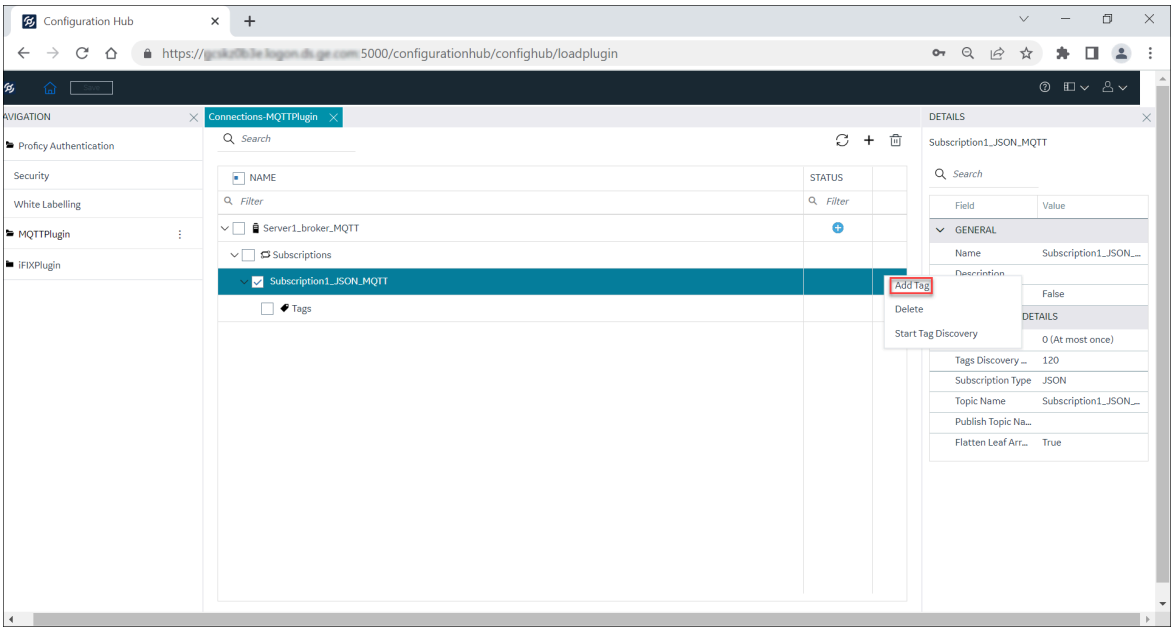
Add Tags to Subscription

For a Subscription, a Tag is added to load the subscribed MQTT data. Data stored in the tags will be translated from MQTT to OPC UA when the data is published.

To add Tags for a JSON or Sparkplug Subscription:

Tag for JSON Subscription

1. Select **Add Tag**.

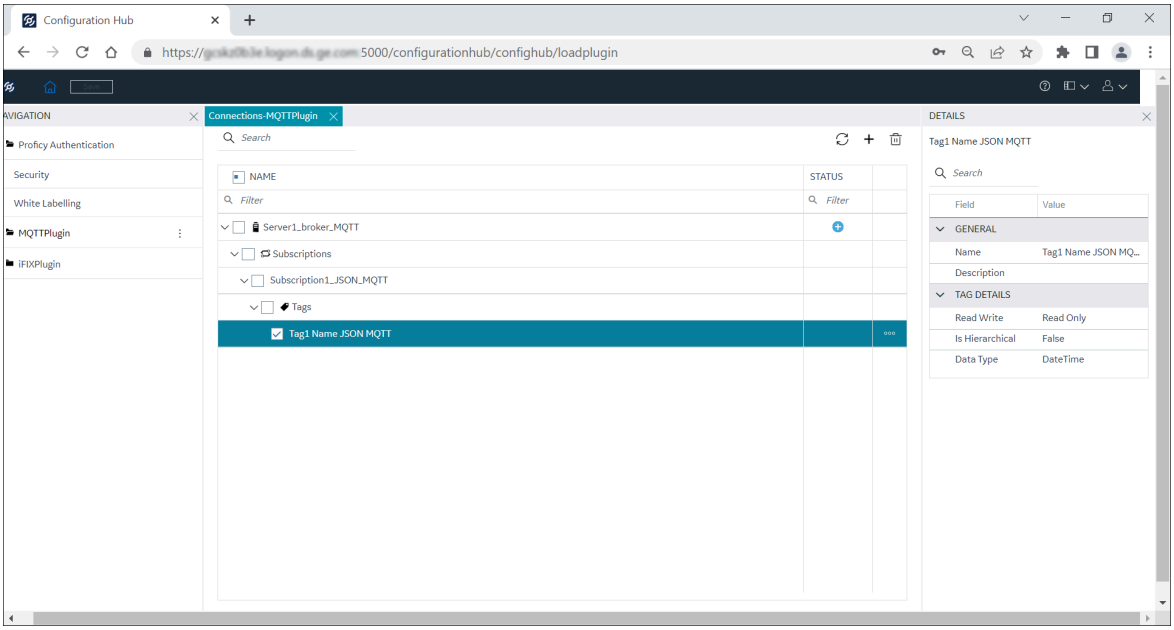


The **New Tag** dialog appears.

2. Enter a **Tag Name** and select the required **Data Type**.

> **Note:**
> - Ensure the following while you enter the information:
>   - Tag names must start with a letter and cannot exceed 1024 bytes.
>   - Do not include spaces in between names.
>   - Names cannot have leading or trailing spaces.
>   - Only the special characters ! # $ % & ( ) _ - [ ] | \ > < / are allowed.
>   - Field names cannot be left blank. Duplicate names are not allowed.

3. Click **Add**.



The Tag is added to the JSON subscription. Click **Save**.

> **Note:**
> You can modify the Data Type value for the JSON Subscription.

Table 63. JSON Tag Details

Field	Value
GENERAL	

Table 63. JSON Tag Details (continued)

Field	Value
Name	Enter a tag name.
Description	Enter the tag description.
TAG DETAILS	
Read Write	You can set the value to Read Only or Read and Write. Read Only: You can only read the tag values from the OPC UA client. Read and Write: You can read and write/modify the tag values from the OPC UA client.

Is Hierarchical	Is Hierarchical parameter helps to indicate whether the tag is at the root level of a JSON object or at a nested level. Nested tags are represented using a complete tag name delimited using a forward slash (/).
	
	By default, this parameter is set to False.
	
	• True: It is a nested tag.
	• False: It is not a nested tag.
	
	For a JSON object:
	
	• <pre>{
	  "level1":{
	  "level2":68
	  }
	}</pre> If you want to refer to the level2 tag embedded in a level1 object, the tag name will be represented as level1/level2 where / is the delimiter. The **Is Hierarchical** parameter

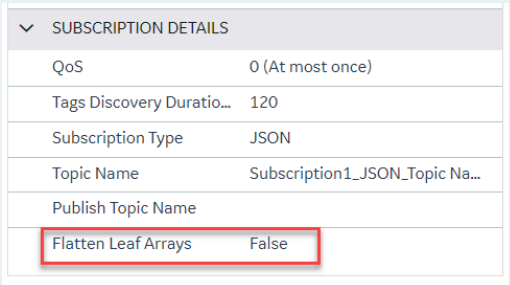
Table 63. JSON Tag Details (continued)

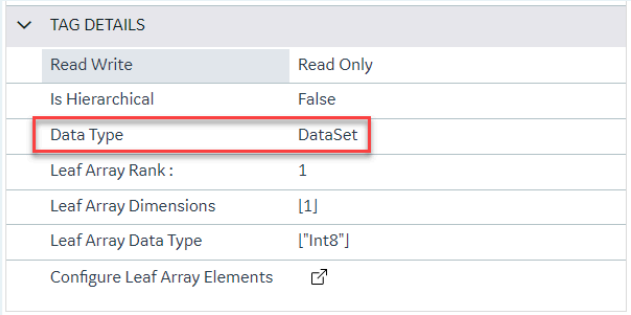
Field	Value

	must be set to True to indicate that it is a nested tag.
	• <pre>{
	"level1/level2":"my string"
	}</pre> If you want to refer to a level1/level2 tag at the root level, then the tag name will be represented as level1/level2. The **Is Hierarchical** parameter must be set to False to indicate that it is not a nested tag.

Data Type	You can select the data type value from the list of available data type entries.

Note:
If Flatten Leaf Arrays is set to False in the JSON **SUBSCRIPTION DETAILS** section, and then if the **Data Type** is set to **DataSet** in the **TAG DETAILS** section, the **Configure Leaf Array Elements** will be displayed to configure the leaf array properties.





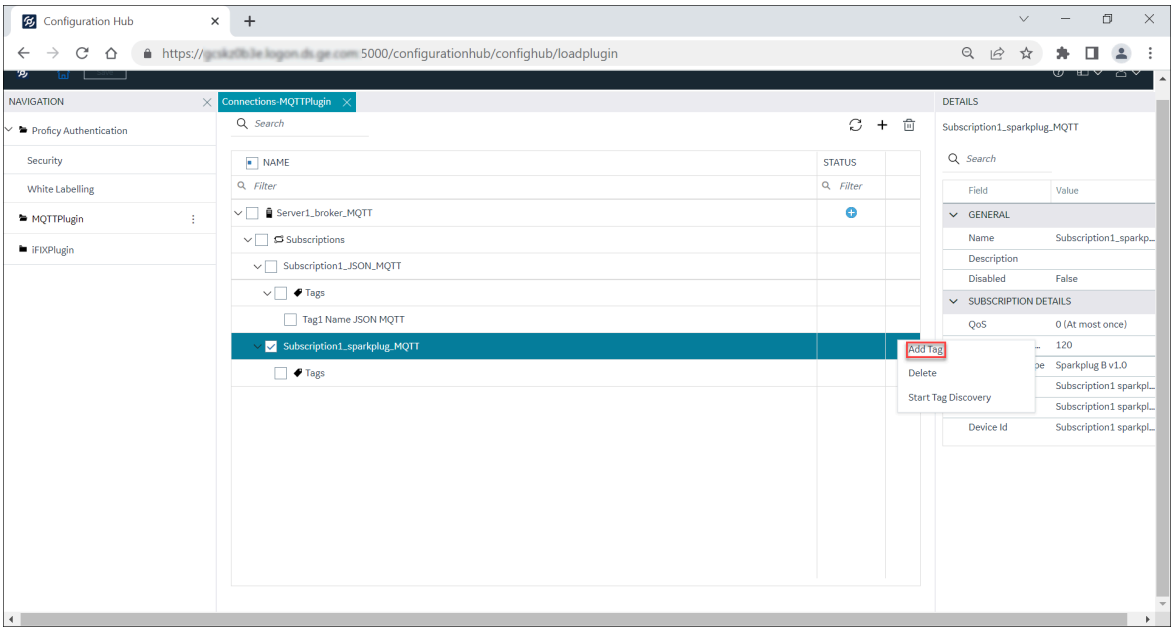
You must select **Configure Leaf Array Elements** to configure the leaf array elements (that is, Leaf Array Rank, Leaf Array Dimensions, and Leaf Array Data Type).

Leaf Array Elements	Description
Leaf Array Rank	The Leaf Array Rank value is the number of dimensions of an array.

Leaf Array Elements	Description
	• 1 - One dimensional • 2 - Two dimensional **Note:** The Leaf Array Rank is set up to two ranks only.
Leaf Array Dimensions	Number of elements in each dimension available corresponding to the Leaf Array Rank number.
Leaf Array Data Type	Select the Data Type as required. **Note:** When you select the **Variant** data type, the Leaf Array Data Types table is displayed with the Index of Elements and its Data Types. That is, you will be populated with the heterogeneous data types in the multi-dimensional array. You can modify the data type per each index in an array.

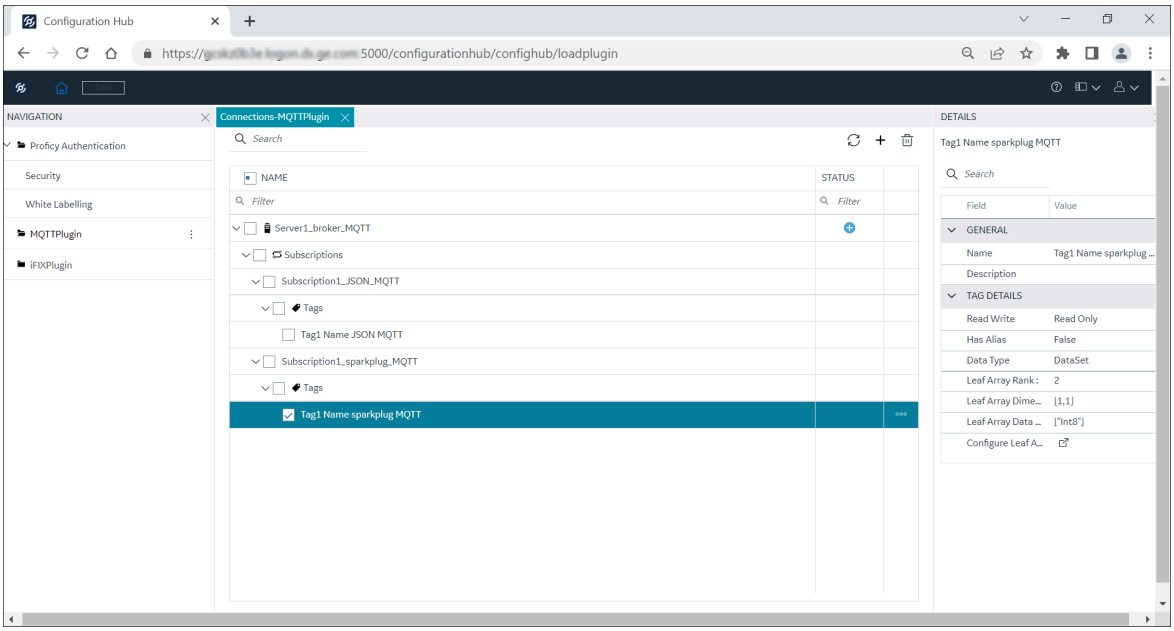
Tag for Sparkplug Subscription

1. Select **Add Tag**.



The **New Tag** dialog appears.

2. Enter a **Tag Name** and select the required **Data Type**.
3. Click **Add**.



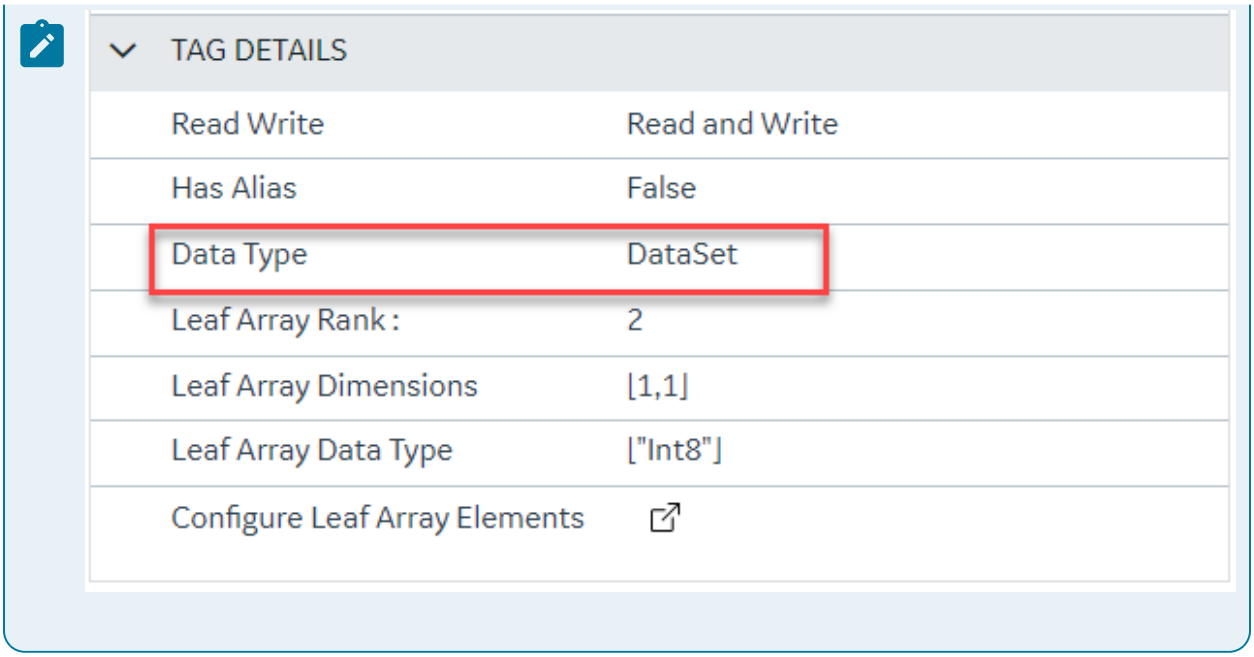
The Tag is added to the Sparkplug subscription. Click **Save**.

Note:
You cannot modify the Data Type value for the Sparkplug Subscription.

Table 64. Sparkplug Tag Details

Field	Value
GENERAL	
Name	Enter a tag name.
Description	Enter the tag description.
TAG DETAILS	
Read Write	You can set the value to Read Only or Read and Write. Read Only: You can only read the tag values from the OPC UA client. Read and Write: You can read and write/modify the tag values from the OPC UA client.
Has Alias	Has Alias is an integer value that is used as a substitute name to reduce the long and repeated usage of the same tag name. By default, this parameter is set to False. • True: The Alias field is displayed. Enter the publisher provided integer value in the **Alias** field. • False: The tag has no Alias name.
Data Type	Displays the data type.

Note:
In **TAG DETAILS**, if the **Data Type** is **DataSet**, then the **Configure Leaf Array Elements** will be displayed to configure the leaf array properties.



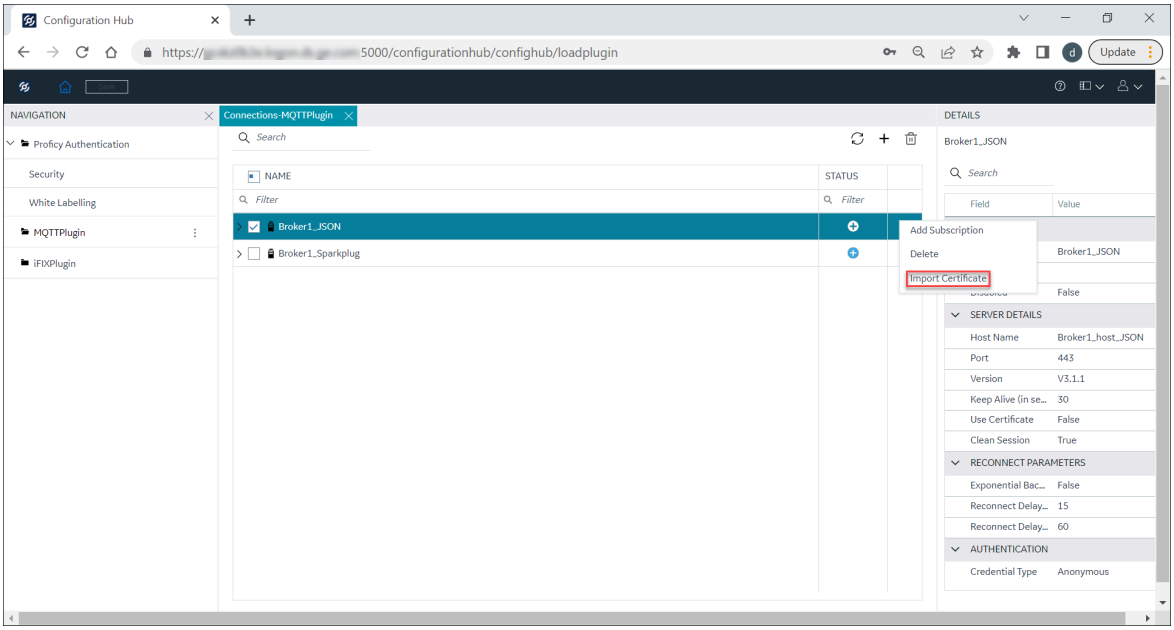
Refer to the above table for more information on Leaf Array Elements.

Secure Connection with Broker

To establish a secure connection with the MQTT broker, you must import the broker certificate and trust the certificate. This encrypts the data and keeps the broker connection data secure and authenticated.

To import the broker certificate:

1. From the **MQTTPlugin**, click the overflow icon ••• of the broker connection and then select **Import Certificate**.

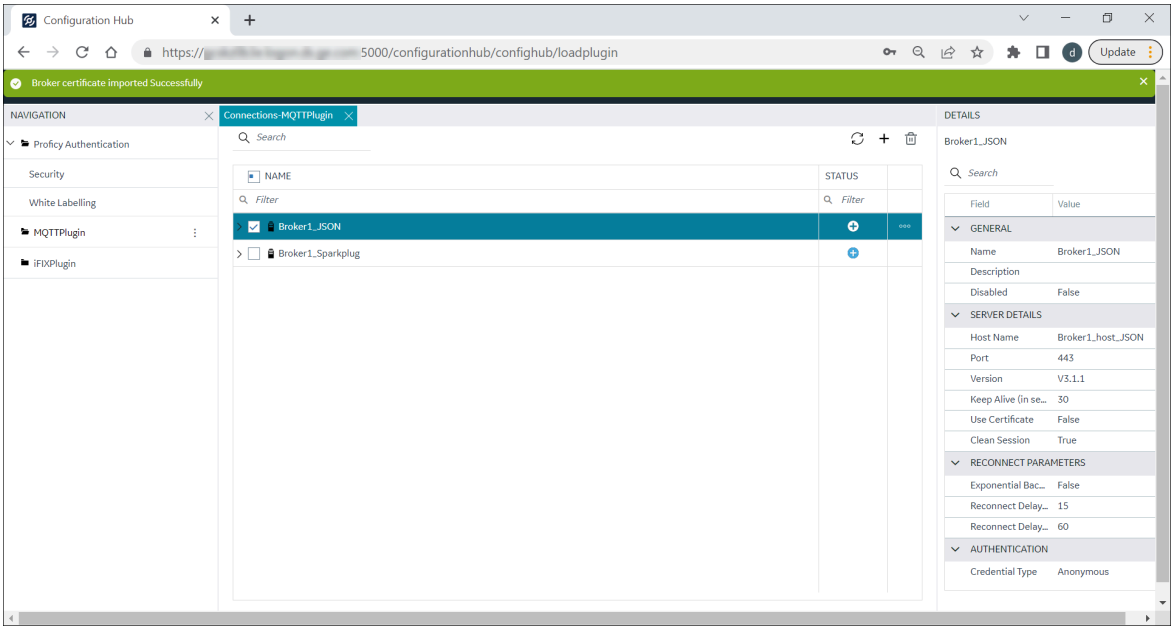


   The **Import Service Certificate** dialog appears.

2. Click **Browse** and navigate to the source location of the broker certificate.
3. Double-click the broker root certificate.
4. Click **View** to view the certificate details.

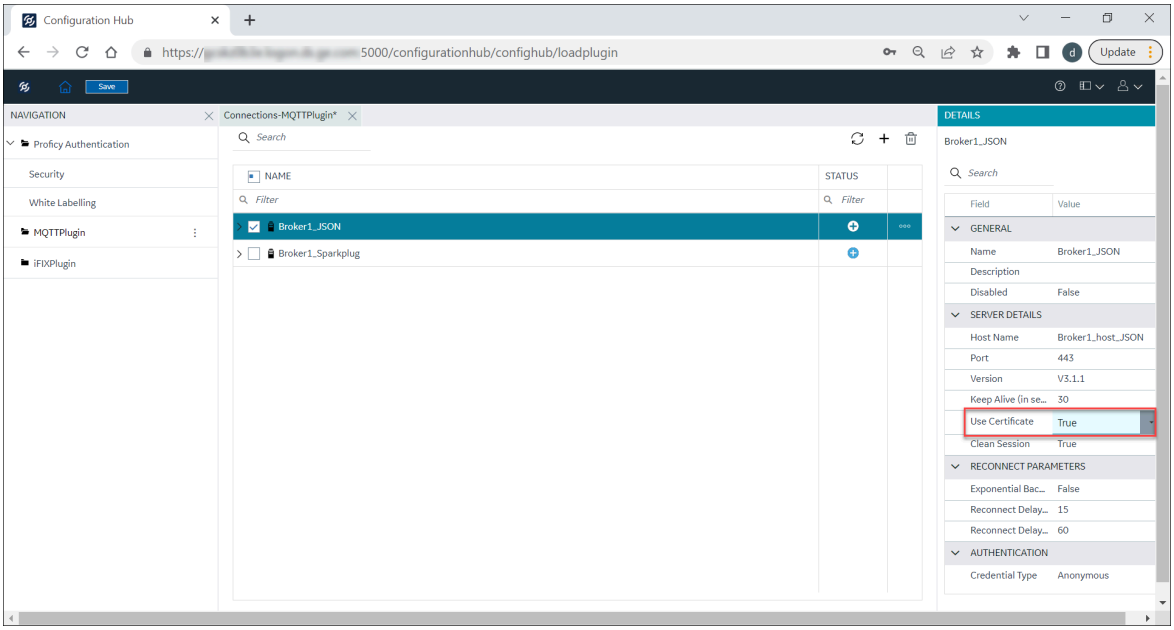
   The **Certificate Details** page appears.

5. Click **Close** on the **Certificate Details** page.
6. Click **Trust** in the **Import Service Certificate** dialog.



The **Broker certificate imported Successfully** message appears.

7. Copy the root certificate `MqttClientRootCA.crt`, and save it to your broker certificate import location.
8. In the **DETAILS** panel, ensure that the **Use Certificate** field is set to **True** in the **SERVER DETAILS** section.

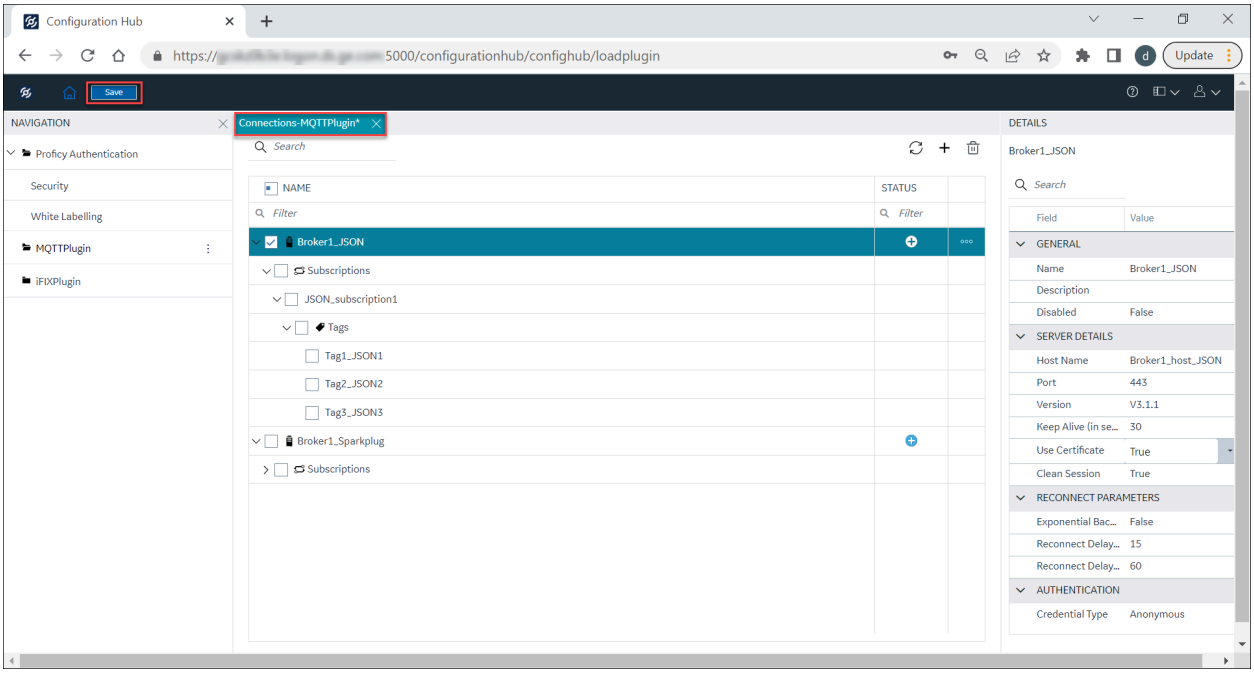


9. Click **Save** and then **Publish**.

   Refer to Save and Publish *(on page 1657)* for more details.

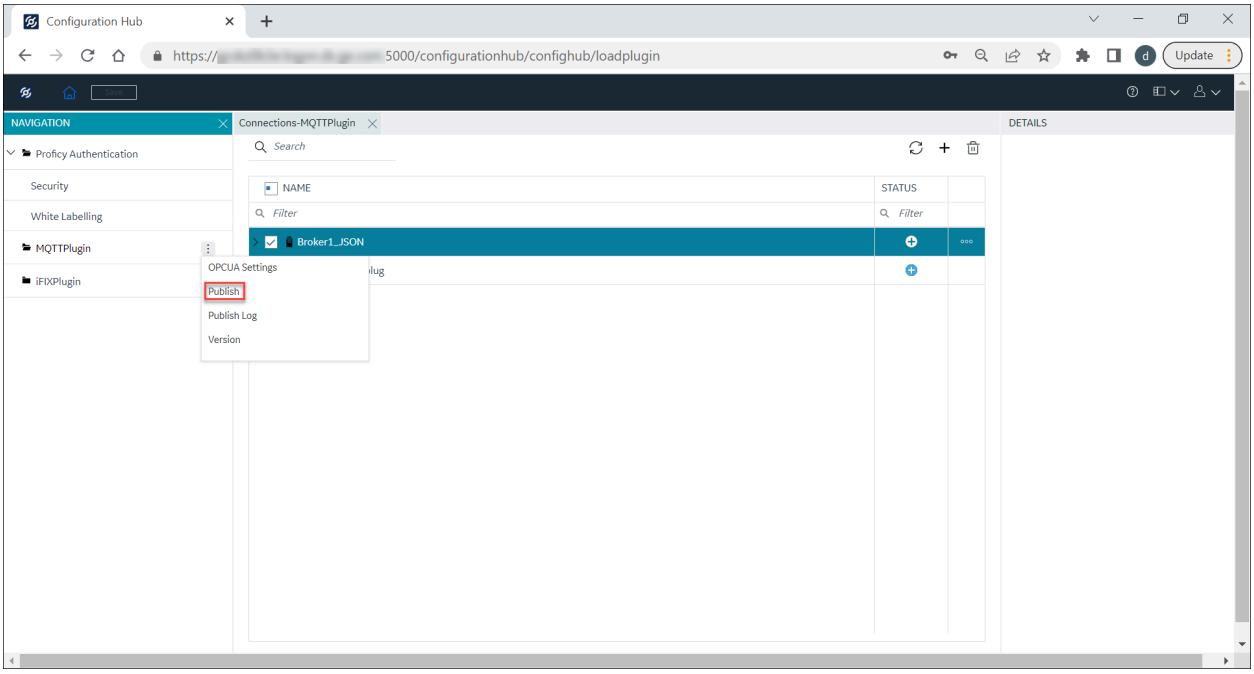
Save and Publish

When the MQTT node is plugged-in with Configuration Hub, the common toolbar will contain the **Save** button at the top left. Changes made in Configuration Hub for MQTT nodes are not saved on the server until the changes are published. Until then, any changes are stored in a separate directory on the node being configured.



The Save button responds to certain panel actions that can queue up and will not be applied to the unpublished list until the Save button is clicked. For example, any changes in the Connections panel must be saved before they are applied. If you do not want to save the changes you made, close the panel, and choose not to save. An asterisk (*) appears in the panel tab when there are unsaved changes. Click **Save** to save the connection panel details.

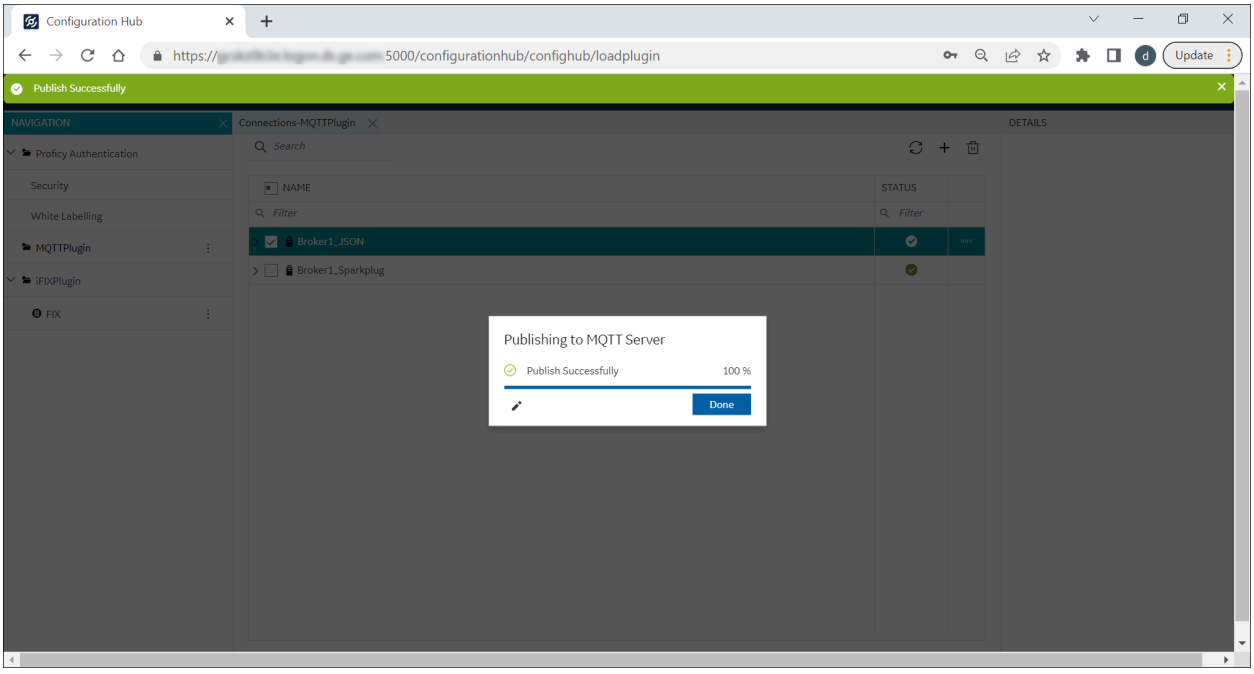
When you are ready to apply the changes to the running system, select **Publish** from the MQTT connection plugin overflow icon ⋮ to push the changes to the server.



A prompt message appears to select **Publish**. Click the Publish button to publish the changes to MQTT server.

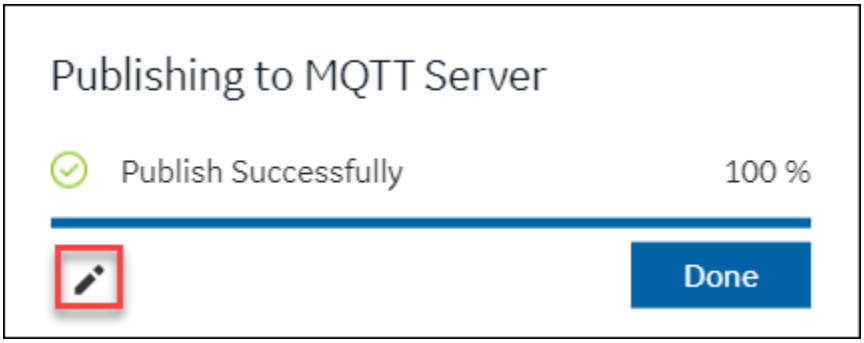
The publish operation begins, after you click the publish button. It may take a while depending on the number of tags being published to the active MQTT node.

The *Publish Successfully* message appears when the changes are published to the MQTT Server.



Publish Log and Version

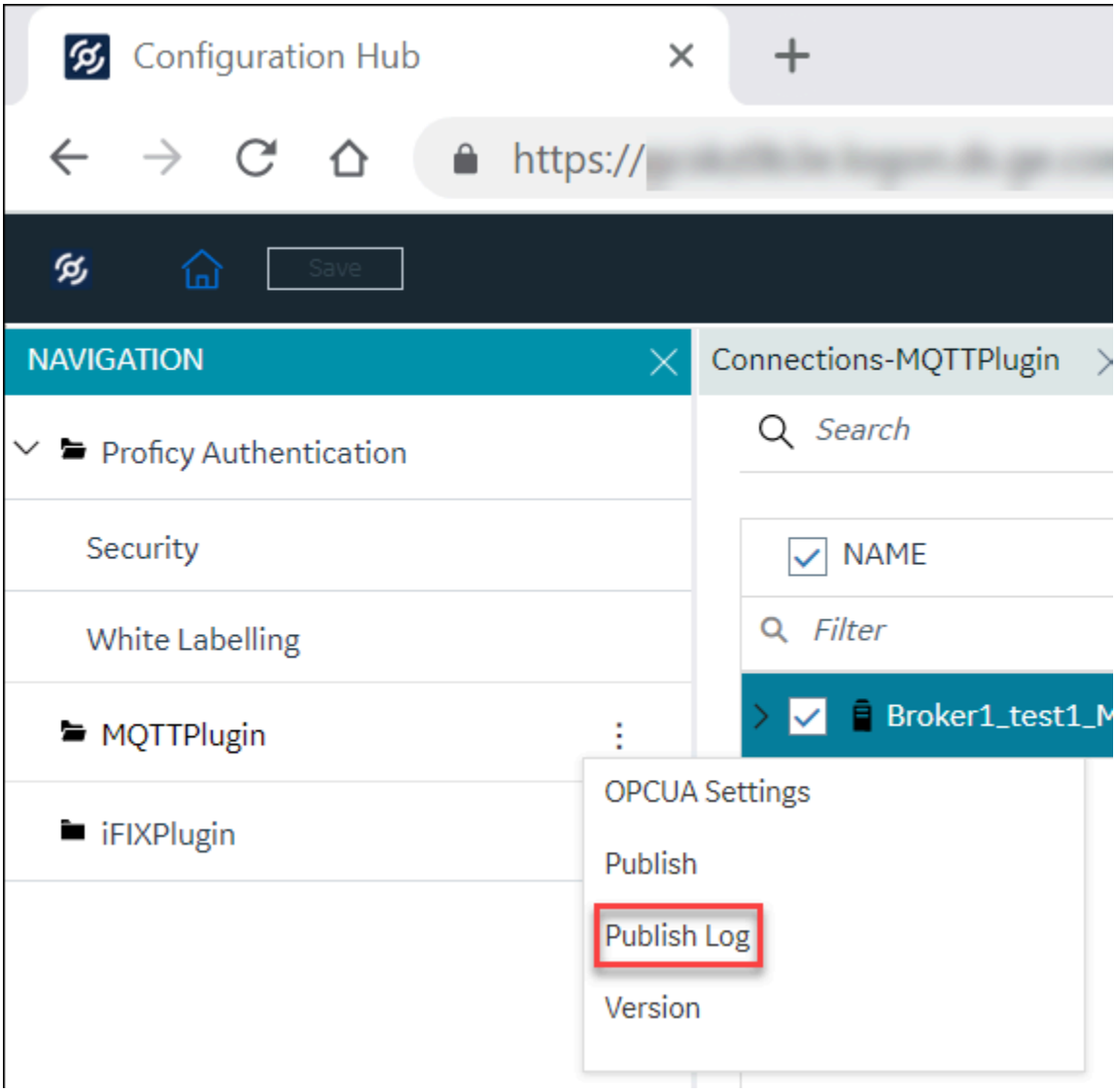
After you publish the MQTT plugin changes, you can directly view the published log reports by clicking the icon.



Publish Log

To view the publish log reports:

1. Click the MQTT plugin overflow icon.
2. Select **Publish Log**.



The **Publish Report** dialog appears.

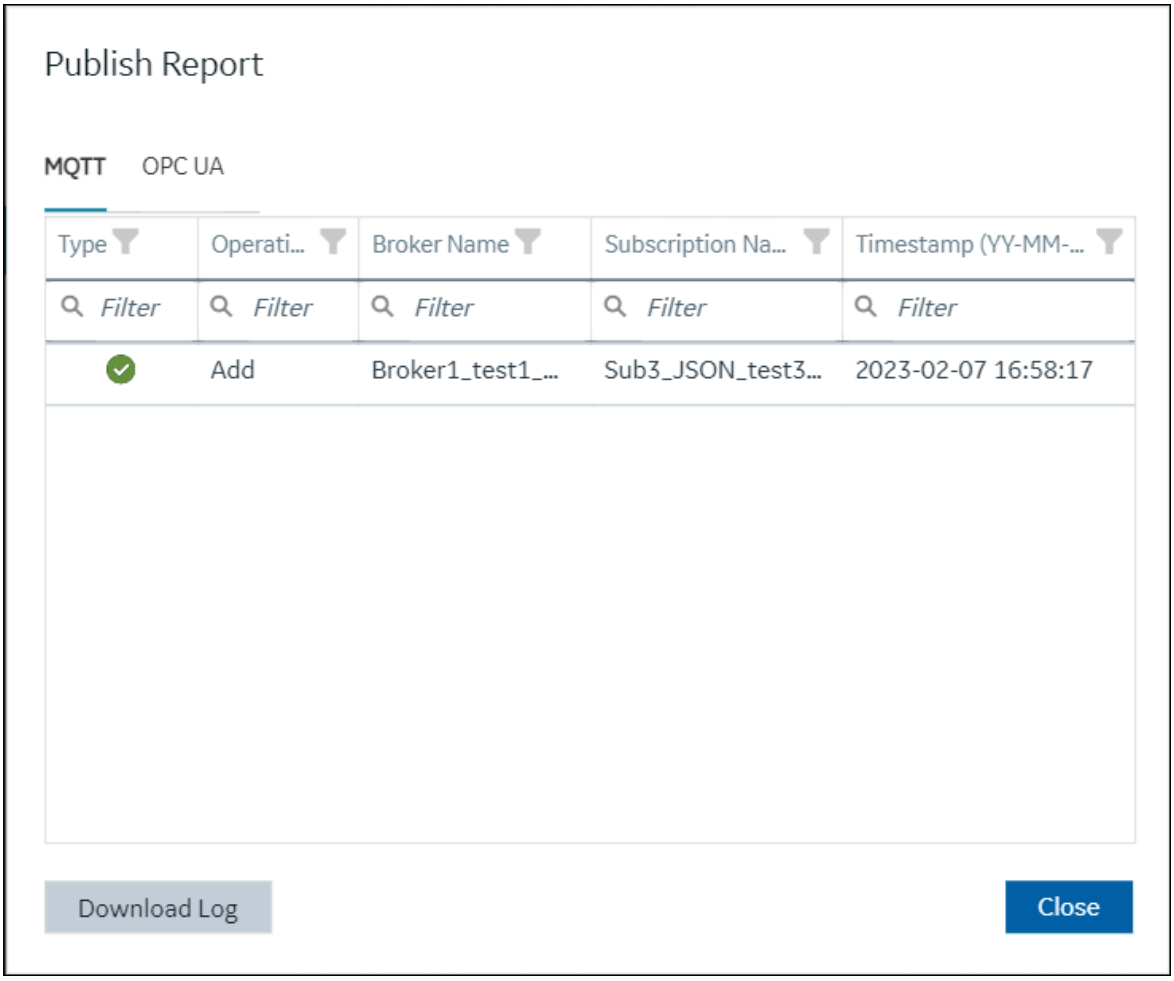


Table 65. MQTT Publish Log Report

Field	Description
Operation	Indicates whether the operation is added, modified, or deleted.
Broker Name	Name of the Broker.
Subscription Name	Name of the Subscription.
Timestamp (YY-MM-DD HH:mm:ss)	Record of the event in the format YY-MM-DD HH:mm:ss.

3. Select the **OPC UA** tab to view the OPC UA log reports.

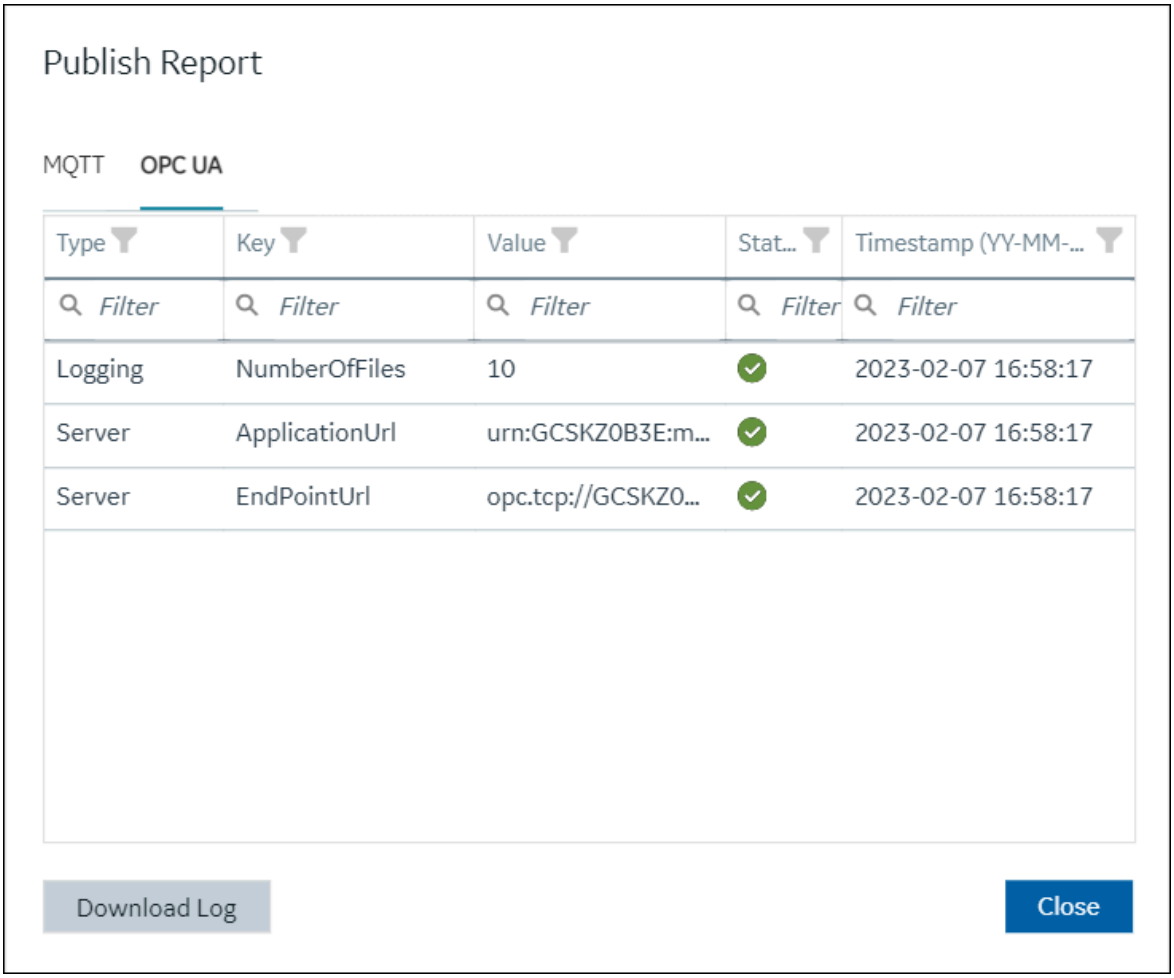


Table 66. OPC UA Publish Log Report

Field	Description
Key	The key refers to the field names in the OPC UA Settings page.
Value	The value entered in the fields of the OPC UA Settings page.
Status	The status of the published log information.
Timestamp (YY-MM-DD HH:mm:ss)	Record of the event in the format YY-MM-DD HH:mm:ss.

Note:

- You can click the icon to filter the data as required.
- You can click the **Download Log** button to download the log information.

Important:

Only the last published log information will be displayed in the **Publish Report** window.

Version

You can click the MQTT plugin overflow icon, and then select **Version**.

The **Version Details** dialog appears.

The MQTT Client application version details are displayed.

OPC UA for MQTT Clients

The OPC UA protocol is a standard communication mechanism for transferring data between interfaces. OPC UA clients connect to the OPC UA server and collect data from UA Variables.

OPC UA is an independent open communication platform for both industrial and business application needs. The OPC UA server acts as a bridge between the IIoT devices (such as sensors, HMI software, SCADA systems, and so on) and OPC UA clients. It protects data integrity and helps in creating a scalable, reliable, and secure connection. OPC UA supports communication protocols, and also the exchanging of data between devices. Information requested by OPC UA clients is translated through the OPC UA server.

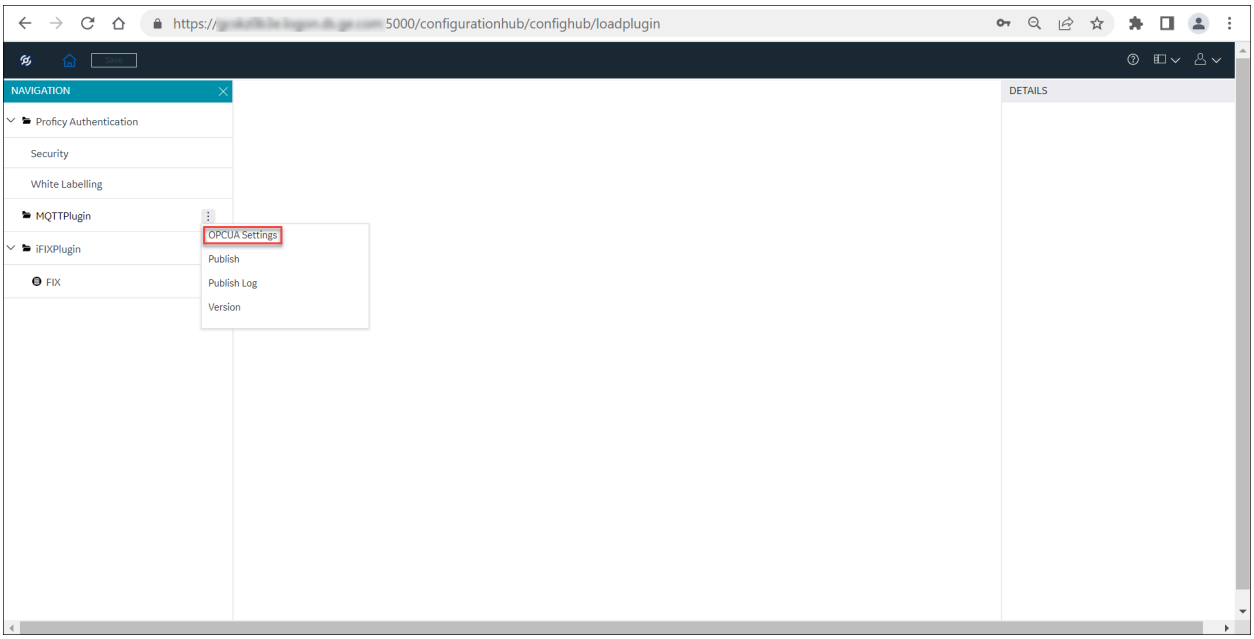
The MQTT client application is used as a two-way data communication. You can also write from OPC UA clients to MQTT clients or from IIoT devices.

After you configure MQTT Client information (that is, establishing the connections, subscriptions, and tags), the OPC UA server reads the configuration and displays the tags in a hierarchical manner. The hierarchy includes the client's name (unique per broker), topic, and the tag name within the topic. The OPC UA server reads the values of the data subscribed to by the MQTT clients. The OPC UA data is then published to OPC UA Clients.

Refer to OPC UA Settings *(on page 1664)* to configure the OPC UA settings page.

OPC UA Settings

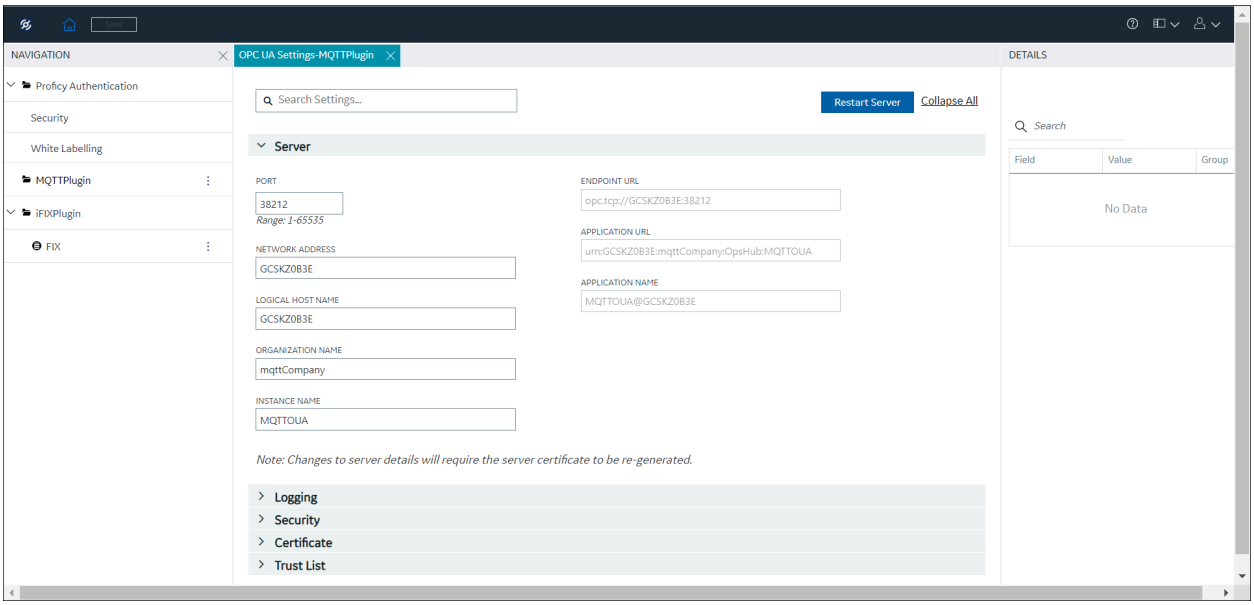
After establishing broker connections, subscriptions, and tags information, click the overflow icon ⋮ of the MQTT plugin, and then select **OPC UA Settings** to connect to the OPC UA server and establish the OPC UA client connection.



Enter the required details in the following sections of OPC UA Settings page:

- Server
- Logging
- Security
- Certificate
- Trust List

Server



The server connection fields are populated automatically by the system. You can also change the server details as required.

Table 67. OPC UA Server Details

Field	Description
PORT	The OPC UA Client port the device will use.
NETWORK ADDRESS	The unique identification of your physical computer or a device name.
LOGICAL HOST NAME	Host name of the server on which OPC UA is installed.
ORGANIZATION NAME	Name of the Organization that owns the application.
INSTANCE NAME	Information about the OPC UA client.
ENDPOINT URL	A network location that OPC UA Client applications can use to find and connect to an OPC UA Server.

Table 67. OPC UA Server Details (continued)

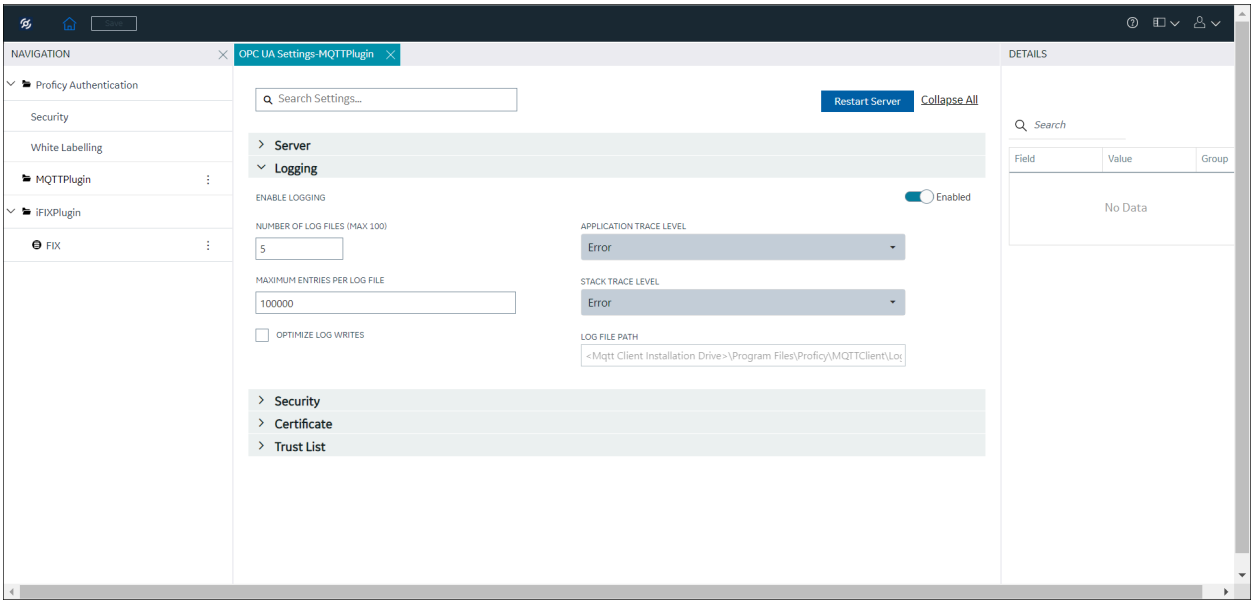
Field	Description
	Note: • An endpoint is a physical address available on a network that allows clients to access one or more services provided by a server. • An OPC UA Endpoint URL (Uniform Resource Locator) is a formatted text string that consists of three or four parts (substrings): 1. Network protocol ((must be opc.tcp (case sensitive)). 2. Host name or IP address. 3. Port number. 4. (Optional) File or resource location. The OPC UA specific URL, it shows as: `opc.tcp://hostname:38212/<file or resource location>`
APPLICATION URL	The unique address reference on the Internet. Also, referred to as the web address.
APPLICATION NAME	Name of the application.

Note:

- If you modify the OPC UA server details, it is recommended to select **Restart Server** to establish the OPC UA server connection.
- If you want to restart the OPC UA server, select **Restart Server** and then, click **Yes** to the **Confirm Regenerate** prompt message. After successful server connection, the following message appears.

  OPC UA Server successfully restarted.

Logging



Logging helps you to record the error reports. The logging section displays the number of log files, maximum entries per log file, application trace level, stack trace level, and log file path fields. You can select the application level and stack level log files as required from the respective drop-down list.

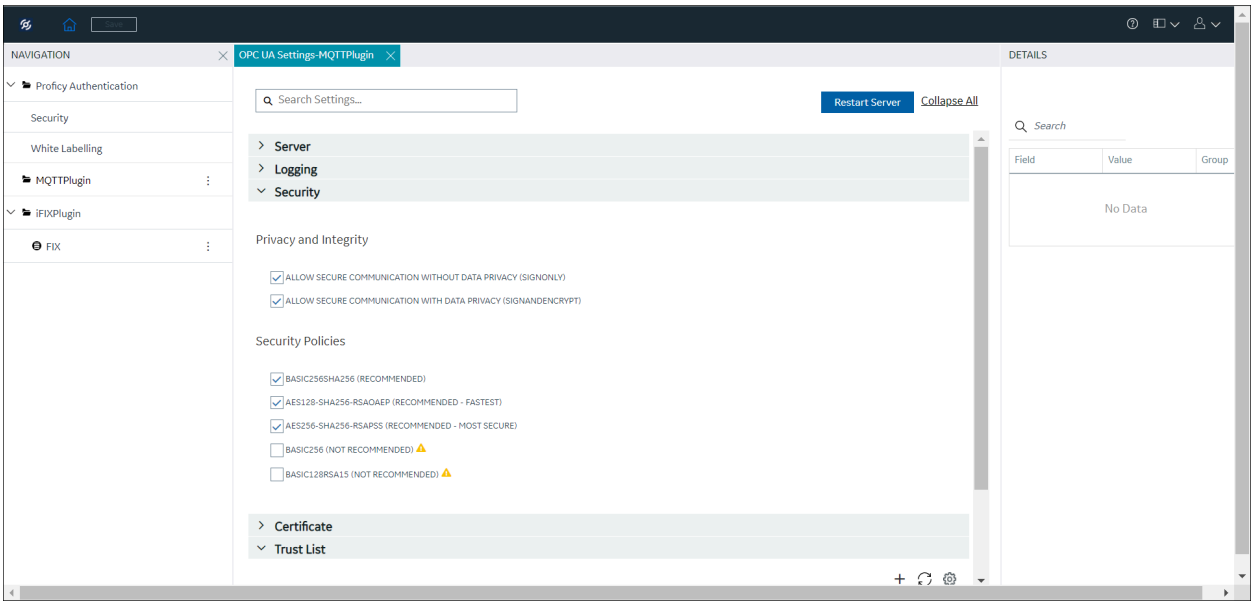
Note:

You can enable or disable logging using the toggle switch in the **Logging** section.

Table 68. Logging Configuration

Field	Description
NUMBER OF LOG FILES (MAX 100)	The number of files for log backups (range is from 1 to 100).
MAXIMUM ENTRIES PER LOG FILE	The number of entry per log file (range is from 0 to 1000000000).
APPLICATION TRACE LEVEL	You can trace the errors or warnings to generate the trace messages. From the application trace level, you can select None, Error, Errors and Warnings, Error, Warnings and Information or, Detailed (may impact performance) as required.
STACK TRACE LEVEL	You can trace the information about frequently used operations. The stack trace helps to find out the debugs in an operation and to figure out the problems for any bug generated in the operation. From the application trace level, you can select None, Error, Errors and Warnings, Error, Warnings and Information or, Detailed (may impact performance) as required.
LOG FILE PATH	Location of the log file. `<Installation Location Drive>\Program Files\Proficy\MQTTClient\Logs\OpcUa-Server.log`
☐ OPTIMIZE LOG WRITES	Select the Optimize Log Writes check box to optimize log events, use structured logging, exclude sensitive information, and to store the data.

Security



Use the check boxes in the **Privacy and Integrity** and **Security Policies** sections to ensure data is secured and protected from unauthorized access. Only authorized users can access the data to view and modify as per user access privileges.

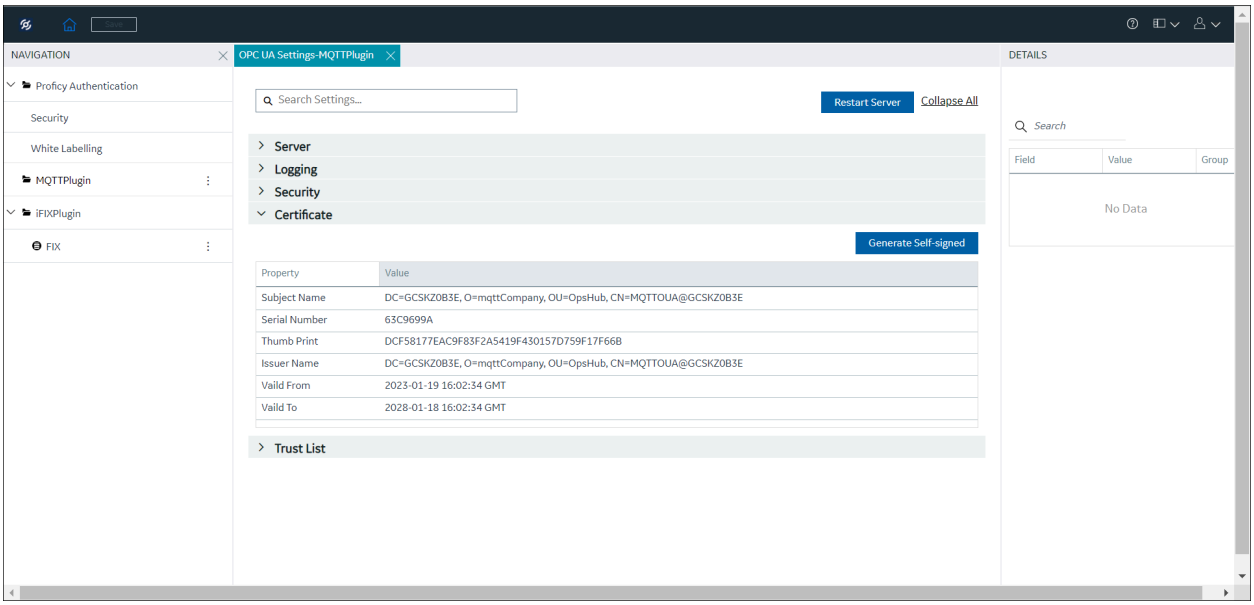
Privacy and Integrity	
ALLOW SECURE COMMUNICATION WITHOUT DATA PRIVACY (SIGNONLY)	Encryption is still used in the initial handshake. This mode is not appropriate when legal requirements prohibit the use of encryption.
ALLOW SECURE COMMUNICATION WITH DATA PRIVACY (SIGNANDENCRYPT)	All messages are signed and encrypted.
Security Policies	
BASIC256SHA256 (RECOMMENDED)	For configurations that require high security.
AES128-SHA256-RSAOAEP (RECOMMENDED - FASTEST)	For configurations that require high speed with average security.
AES256-SHA256-RSAPSS (RECOMMENDED - MOST SECURE)	For configurations that require very high security.

Note:

- BASIC256 and BASIC128RSA15 are deprecated due to vulnerability and theoretical issues.
- You can verify the security permissions at the following location.

```
<Installation Location Drive>\Program Files\Proficy\MQTTClient
\ServerConfig.xml
```

Certificate



To establish the trusted connection with the OPC UA client, you must generate the self-signed certificate.

1. Select **Generate Self-signed** certificate.
2. A prompt message appears. Click **Yes** to regenerate the server certificate.

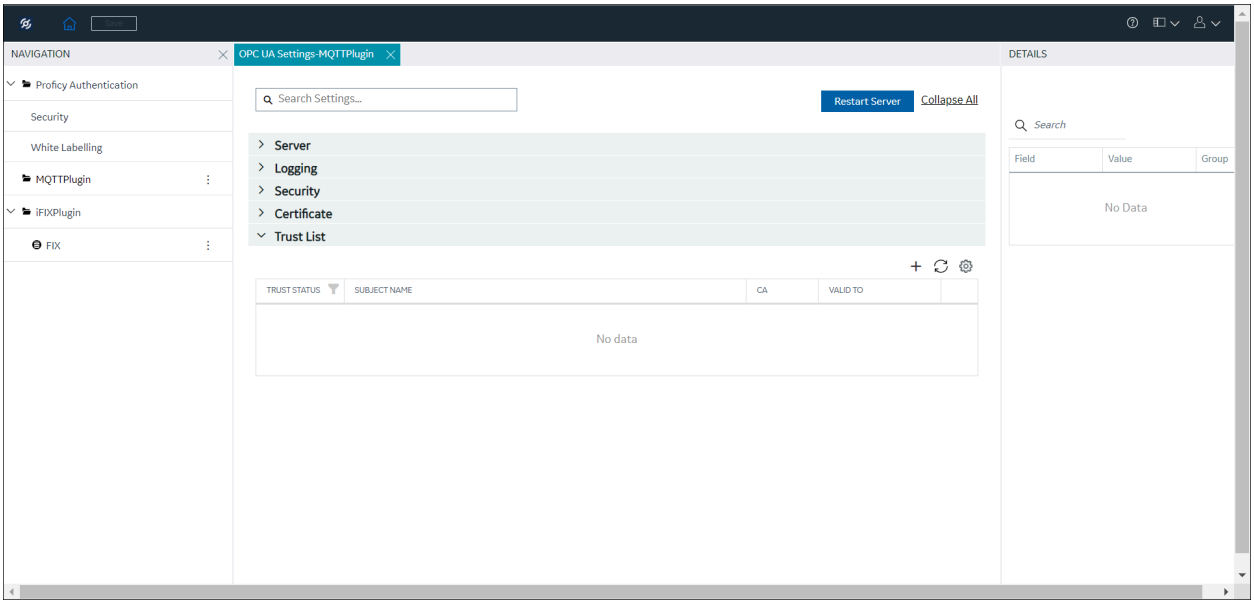
Important:

All previous server settings will be removed, and new details are updated.

OPC UA certification created successfully message appears.

3. Select **Restart Server** to use the certificate. The new server certificate details are populated in the **Certificate** section.
4. To view the server certificate, navigate to `<Install Location Drive>\Proficy \MQTTClient\UA\pkiserver\own\certs`.

Trust List



The trust list will display the certificate status (trusted and rejected) and its validity period. Use the overflow icon ••• and select **Trust** to trust the rejected certificate, or select **Reject** to reject the already trusted certificate, and select **Delete** to delete the certificate from the trust list.

If a client certificate is not displayed in the Trust List table:

- Select the **Refresh** icon. This will load the client certificate to the Trust List table or,
- Select the **Add Certificate** + icon. The **Import Trust Certificate** dialog appears. You can then browse to the client certificate location and Trust the certificate.

After the OPC UA settings information is saved, you can select the overflow icon ⋮ of the MQTT plugin and select **Publish** to publish the changes to the MQTT server. Refer to Save and Publish *(on page 1657)* for more details.

Chapter 10. Settings

Switch Users

1. Locate the user button on the top right of the toolbar. 
2. Select Logout.
3. Login again under the new user name.

Modify Layout

You can modify the layout in Configuration Hub by:

- Using the split bar to resize panels.
- Open or closing tabs.
- Open or closing panels.
- Resizing the browser window to resize all open panels.

Host Name Changes for Configuration Hub

This section describes the steps to follow if you need to change the host name of the Configuration Hub server or the iFIX server (or both when the Configuration Hub server is local to the iFIX server). Be aware that the iFIX plugin will only be accessible in Configuration Hub if the certificates are valid. If the host name is changed (in either Configuration Hub or iFIX) and you did not update the certificates, then iFIX plugin may not be accessible in Configuration Hub, as the certificates are not valid anymore. Use the following steps to update your certificates.

Steps for Self-Signed Certificate Creation Due to Configuration Hub Server Host Name Change

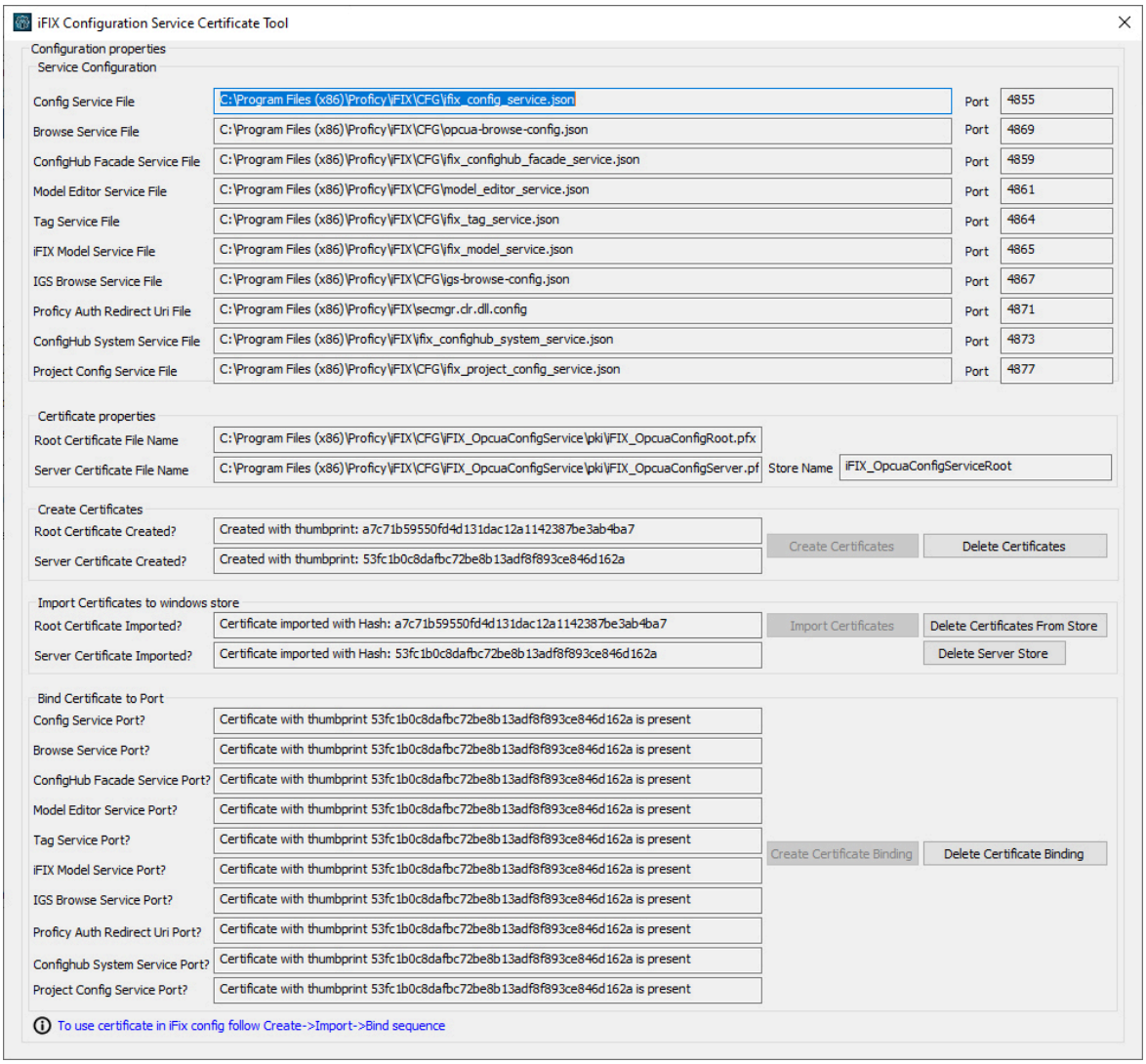
During the Configuration Hub install, self-signed certificates are created and stored in the C:\Program Files (x86)\Proficy\ConfigurationHub\ConfigHubPki folder. The Configuration Hub server certificates are stored in the C:\Program Files (x86)\Proficy\ConfigurationHub\Web\conf directory. If you want to change the web server name after the Configuration Hub install, you need to update the self-signed certificates. See Server Certificates for Configuration Hub *(on page 67)* for steps.

Steps for Self-Signed Certificate Creation Due to iFIX Server Host Name Change

On the iFIX side, during install, self-signed certificates are created and stored in the C:\Program Files (x86)\Proficy\iFIX\CFG\iFIX_OpcuaConfigService\pki folder. The iFIX HTTPD server certificates are stored in the C:\Program Files (x86)\Proficy\iFIX\web\conf directory. When the host name changes you will also need to update your iFIX certificates.

Use the following steps to update your self-signed certificates for iFIX:

1. Open iFixConfigServiceCertTool.exe as an administrator. This tool is found in the C:\Program Files (x86)\Proficy\iFIX\ folder. The iFIX Configuration Service Certificate Tool appears, similar to the following figure.



2. Click Delete Certificates, and then click Delete Certificate Binding.

3. From the Windows File Explorer, remove or backup the certificate files in C:\Program Files (x86)\Proficy\iFIX\CFG\iFIX_OpcuaConfigService\pki directory.
4. From iFIX Configuration Service Certificate Tool, create the new certificates by clicking on the Create Certificates button.
5. After the new set of certificates are created, ensure that the certificate thumbprint is different in the iFIX Configuration Service Certificate Tool. If they are not different, the new certificates are not created. The following figure shows an example of the before and after:

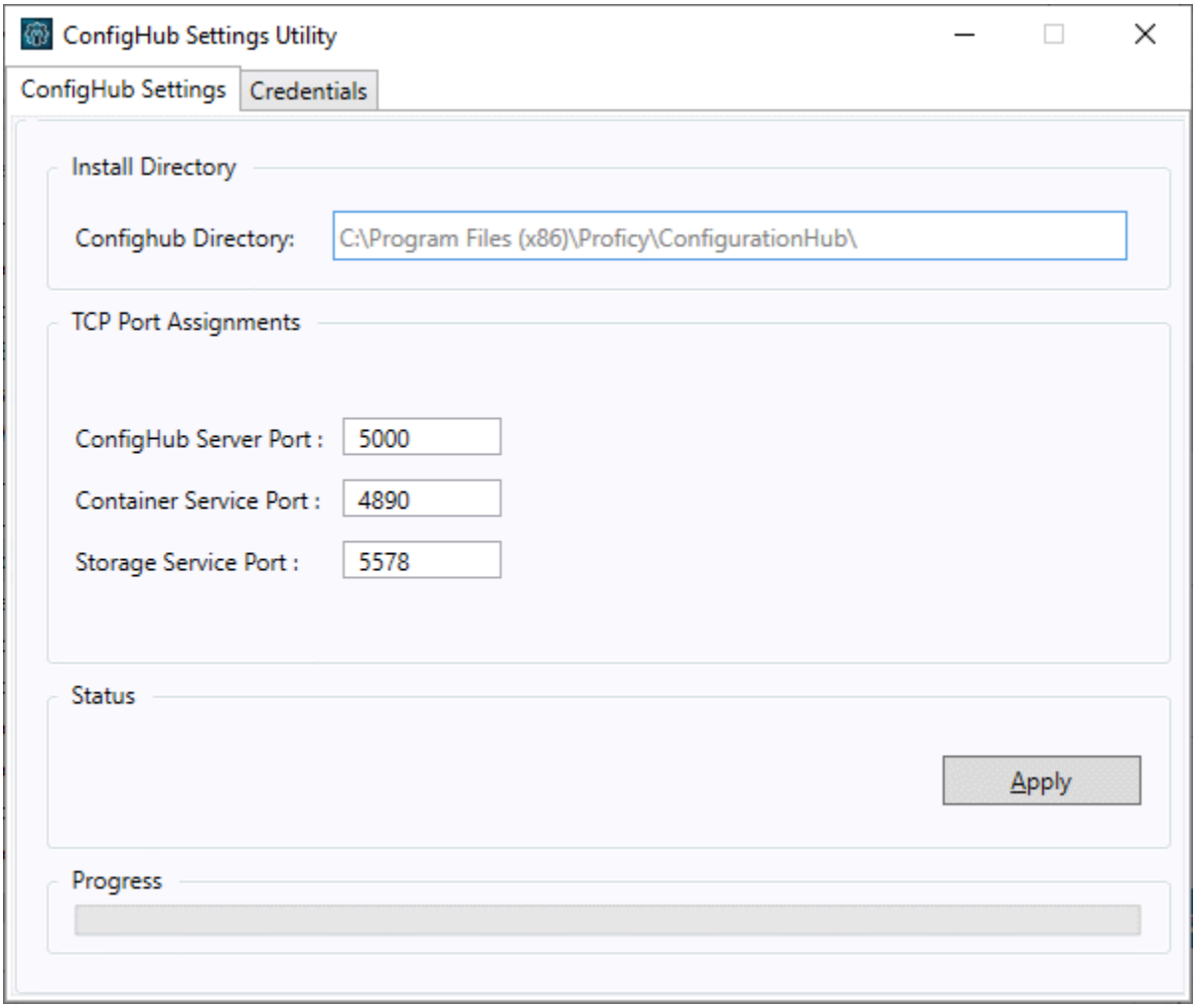
   Before host name change the certificate thumbprint from utility is:

   After the new certificate creation, the thumbprint is:

6. Copy the iFIX_OpcuaConfigServer.crt and iFIX_OpcuaConfigServer.key files from C:\Program Files (x86)\Proficy\iFIX\CFG\iFIX_OpcuaConfigService\pki into the C:\Program Files (x86)\Proficy\iFIX\web\conf directory.
7. Restart the computer.

Port Changes for Configuration Hub

If you need to change the ports used by Configuration Hub web server after install, use the `ConfigHubSettingsUtility.exe` utility found in the Configuration Hub folder (by default this folder is here: `C:\Program Files (x86)\Proficy\ConfigurationHub`) to reset them.



Note:

If you are planning to update the ConfigHub Server port number which is the Configuration Hub web server, then you must update all plugins to update ConfigHub Server port change. Otherwise, the plugins cannot communicate with the Configuration Hub. To update your iFIX plugin post install, use the Registration tool available in the iFIX WorkSpace; see iFIX Plugin Registration *(on page 268)* for more information. To update your Historian plugin post install, use the Web_Clients_Configuration_Tool.exe tool available in the C:\Program Files\GE Digital \Historian Config folder.

Chapter 11. Troubleshooting

Log Files

Install Log Files

When installed with the Proficy installer, the log for the Configuration Hub portion of the install is named ConfigHubInstaller.log. This log appears in the `C:\Users\Admin\AppData\Local\Temp` folder and can be used to troubleshoot any issues that occur during install. You will need to show hidden files, folders, and drives to view this file.

Configuration Hub Log Files

By default, the log for Configuration Hub is saved to the following location: `C:\Program Files (x86)\Proficy\ConfigurationHub\Logs`, and this folder for the web server logs: `C:\Program Files (x86)\Proficy\ConfigurationHub\Web\httpd\logs`.

IGS Log File

For IGS, a log file named igs-browse-config.log is located in the `C:\Program Files (x86)\Proficy \iFIX\LOCAL\Logs` folder, by default. There is also an Industrial Gateway Server.log file in the `C: \Program Files (x86)\Proficy\Industrial Gateway Server` folder, by default.

Historian Log Files

For Historian, the logs are saved in this folder, by default: `C:\Proficy Historian Data\LogFiles`, or custom install path as specified during the Historian installation.

MQTT Client Log Files

For MQTT Client, the logs are stored in the default install path. By default, this path is: `C:\Program Files\Proficy\MQTTClient\Logs`.

Proficy Webspace Log Files

For Webspace, the logs are stored in the Webspace default install path. By default, this path is: `C: \Program Files\Proficy\Proficy WebSpace\Log`.

Webspace messages are recorded within log files prefixed with aps and followed by the date and time (to the nearest millisecond) the Webspace Application Publishing Service was started (for example: aps_2023-03-31_15-14-34.html). A new log file is created each time the Proficy Webspace Application

Publishing Service is started. The log file with the latest date and time stamp contains messages for the current or most recent instance of the Proficy Webspace Application Publishing Service.

The Webspace session manager logs are stored to the `C:\Program Files\Proficy\Proficy WebSpace\Programs\webspace-session-manager` folder, by default. The webspace-session-manager.log file is the name of the log file.

Proficy Authentication Log Files

The default location for the Proficy Authentication log files is the `CC:\ProgramData\ProficyAuthenticationLogs` folder. If However, if Operations Hub has installed Proficy Authentication than it may be the `C:\ProgramData\OphubLogs` folder.

iFIX Web Server Log Files

For the iFIX Web Server, the log files are located in the `C:\Program Files (x86)\Proficy\iFIX\web\logs folder`, by default.

iFIX Log Files

For iFIX, the associated logs are in `C:\Program Files (x86)\Proficy\iFIX\LOCAL\Logs` folder, by default. The names of these files are:

Log Name	Description
ifix_config_service.log	iFIX OPCUA Config Service log file.
ifix_config_service_cert.log	iFIX Configuration Hub certificate service log file.
ifix_confighub_facade_service.log	iFIX ConfigHub Facade service log file.
ifix_model_editor_service.log	Model editor service log file.
ifix_model_service.log	iFIX model service which is used for publishing model information to iFIX.
ifix_project_config_service.log	iFIX project configuration service log file.
ifix_tag_service.log	iFIX tag service log file.
ifix_tag_validators.log	iFIX tag validator log file.
ifix_webspace.log	Proficy Webspace log file.
igs-browse-config.log	IGS browsing log file.

The following list are the .json files located in the iFIX\CFG folder that are associated with the log files in the previous table:

- ifix_config.service.json
- ifix_confighub_facade_service.json
- ifix_confighub_system_service.json
- ifix_model_service.json
- ifix_project_config_service.json
- ifix_tag_service.json
- ifix_tag_validators.json
- igs-browse-config.json
- model_editor_service.json

Each of these .json files have an entry called "level" that accepts various values in lower case to capture greater detail of information. iFIX must be restarted after any modification of any of the levels in the json files.

Important:
If you change any of the logging levels for the ,json files, after you've finished capturing the logs, be sure to set the level back to the default of "info". Otherwise, leaving the log at a level of "info" can impact performance.

Example of Modified .json File for Logging

Below is an example of the ifix_model_service.json file. Note that the "level" is currently set to "info." This value can be changed to any of the values in the following list. Note, that all values set for the level must be lower case.

```
{
    "port":  "4865",
    "secure":  true,
    "log":  {
  "enable":  true,
  "name":  "ifix_model_service.log",
  "level":  "info",
  "max-size":  5242880,
  "max-files":  3,
  "flush-seconds":  10
    },
```

```
    "publishResponseUri": {
       "file": "ifix_confighub_facade_service.json",
       "uri_path": "/ifix-confighub-facade/v1/ifix/publish/response"
   },
   "unpublishModelFilename":  "model_editor.sqlite",
"createModelInfoCommand": "CREATE TABLE IF NOT EXISTS model_info ( model_version INTEGER(8) NOT NULL, lastPublishTime
DATETIME, lastPublishUser TEXT(64) )"
}
```

The log level goes from off to trace. The default level is "info". The recommendation is to set the level to "trace" when troubleshooting the logs. After changed, iFIX will need to be restarted. The log files are located in the iFix\LOCAL\Logs directory.

Important:
After you've finished capturing the logs, be sure to set the level back to the default of "info". Otherwise, leaving the log at a level of "info" can impact performance.

Error Logging Levels for iFIX .json Files

Acceptable entries for "level" are listed below:

- **off** – To disable logging for the REST service.
- **critical** – For this value the REST services do not have any messages implemented. This setting will output log messages for critical level only.
- **error** – This level captures any error logs. This setting will output log messages for critical and error levels.
- **warning** – Some warning messages are implemented in the REST. This setting will output log messages for critical, error, and warning levels.
- **info** – This is the default value set in the JSON files. This setting will output log messages for critical, error, warning, and info levels.
- **debug** – This setting will output log messages for critical, error, warning, info, and debug levels.
- **trace** – This log level will output every log message implemented in the REST service. This setting will output log messages for critical, error, warning, info, debug, and trace levels.

Frequently Asked Questions

When Would I Use the Database Import/Export vs. the Model Import/Export?

Use the Database import/export when you want to import/export tags to your iFIX database. These tags can be regular tags (non-model), or both model and non-model tags.

Use the Model import and export to help you move the model from one node to another, to make bulk changes to the model itself, or to use your model in Operations Hub.